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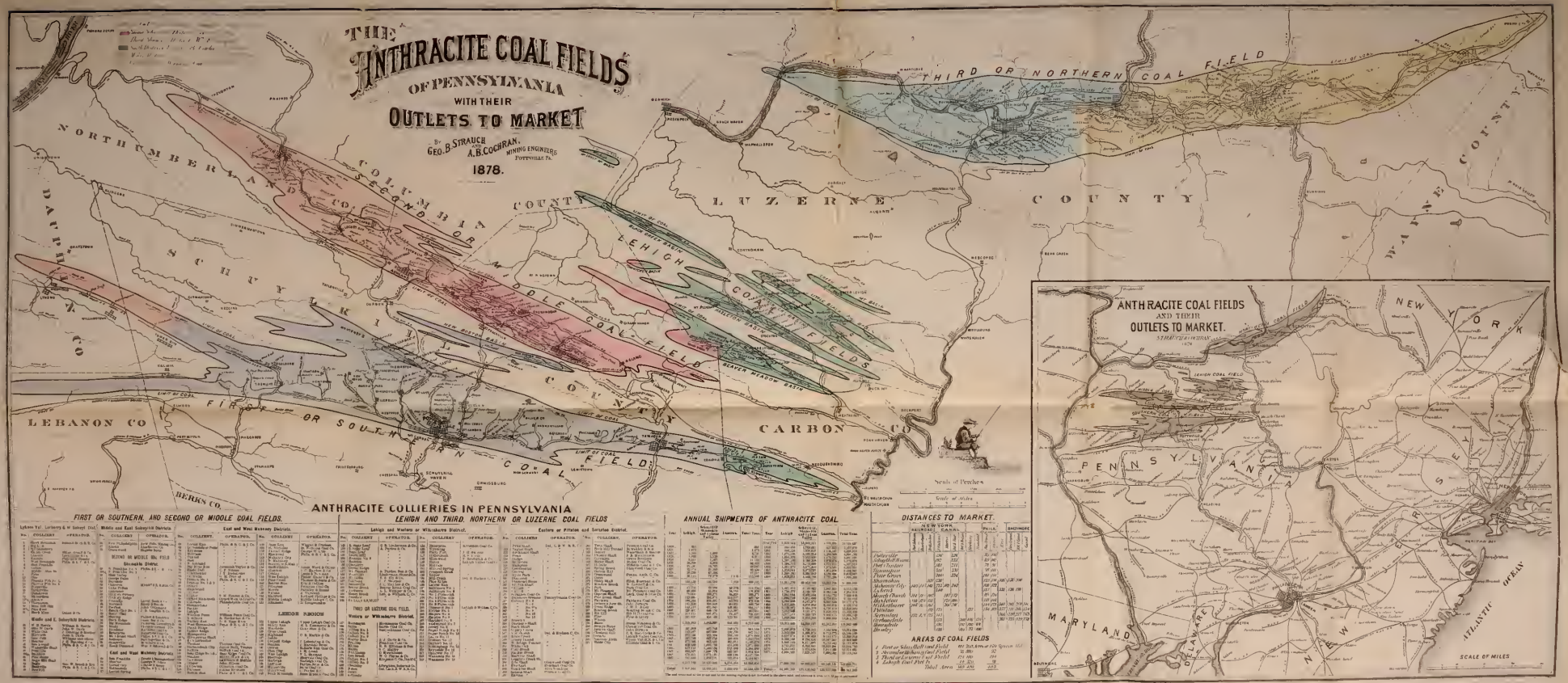

ANTHRACITE COLLIERIES IN PENNSYLVANIA

FIRST OR SOUTHERN, AND SECOND OR MIDDLE COAL FIELDS.

Lykens Val. Lorberry & W. Schuylk. Dist. Middle and East Schuylkill Districts.

No.	COLLIERY	OPERATOR.
1	Short Mountain	Robert D. & S.
2	Rock Hill	
3	Rock Hill No. 2	
4	Wm. Penn	
5	Wm. Penn No. 2	
6	Big Lick	
7	Big Lick No. 2	
8	Big Lick No. 3	
9	Big Lick No. 4	
10	Big Lick No. 5	

REPORTS

OF THE

INSPECTORS OF MINES

OF THE

ANTHRACITE COAL REGIONS OF PENNSYLVANIA,

FOR THE

YEAR 1877.

HARRISBURG:
LANE S. HART, STATE PRINTER
1878.

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1877

REPORTS

OF THE

INSPECTORS OF MINES

OF THE

ANTHRACITE COAL REGIONS OF PENNSYLVANIA,

FOR THE YEAR 1877.

MINING DISTRICT OF SCHUYLKILL,

Comprising the Counties of Schuylkill, Northumberland, Columbia, and Dauphin, Respectively,

POTTSVILLE, PA., *March 20, 1879.*

To His Excellency, JOHN F. HARTRANFT,

Governor of Pennsylvania:

DEAR SIR: Herewith please find the annual reports of the Inspectors of Mines, comprising the mining district of Schuylkill.

Respectfully yours,

WM. M. RANDALL,

Clerk.

FIRST OR POTTSVILLE DISTRICT.

Office of Inspector of Mines, First District,
Mining District of Schuylkill.
Pottsville, *March 1, 1878.*

To His Excellency, John F. Hartranft,
Governor of the State of Pennsylvania:

Sir: In accordance with the requirements of the act of Assembly, I have the honor of submitting to you my annual report of tonnage of coal shipped, condition of the collieries, accidents, and general information concerning the collieries in this district during the year which has jus closed.

The number of accidents that have occurred during the year is somewhat greater in the aggregate than for 1876, but in proportion to the quantity of coal mined, it is a source of gratification to me to be able to report that the casualties are considerably less.

I am also happy to have the honor to report that the collieries in this district are in a much better condition than at the date of my last report. This fact, taking into consideration the rigid system of economy rendered necessary by the depressed condition of the coal trade, shows that the present owners and operators of collieries realize the advantage of keeping them in good working condition, and have become satisfied that the money expended in improvements, is the most remunerative of any portion of their investments.

With the revival of trade, and consequent prosperity which we all anticipate with so much confidence, I have no doubt, with the coöperation of all parties engaged in this necessarily hazardous business, that we shall arrive at that point which we are gradually, but surely approaching, when the mining accidents will be reduced to the lowest minimum which can be attained under the naturally dangerous character of the occupation.

By the courtesy of Messrs. Strauch and Cochran, mining engineers of Pottsville, I am enabled to furnish a map of the anthracite coal region, and, as I think it will be instructive and interesting to our miners, I append it to my report.

The information alluded to, is herewith submitted to in detail.

Very respectfully, your obedient servant,

SAMPSON PARTON.

REGISTER OF FATAL CASUALTIES.

DATE OF MONTH.	NAMES OF PERSONS KILLED.	OCCUPATION.	NAMES OF THE COLLIERIES.	REMARKS.
Jan. 8,	John Larkin,	Miner,	Beechwood,	Run over by mine wagon at bottom of slope.
27,	George Evans,	do.	Mine Hill Gap,	Explosion of sulphur—fired by naked lamp, after being warned by fire boss not to enter.
27,	Thomas Hoar,	do.	do. do.	
March 3,	Andrew Govern,	do.	Otto,	Found dead—verdict, from natural causes.
9,	Thomas Hatton,	do.	Glendower,	Caught under pump rods.
13,	Oliver Jefferson,	Laborer,	Mine Hill Gap,	Fell down slope whilst working at column pipe.
April 25,	William Sykes,	Miner,	Beechwood,	Breaking of chain in slope.
May 7,	Ephram Rupp,	do.	Lincoln,	Fall of coal.
9,	Benjamin Mosely,	do.	Wadesville,	Explosion of gas.
9,	Herbert Moore,	do.	do.	do. do.
9,	John Durken,	do.	do.	do. do.
9,	Thomas Conners,	do.	do.	do. do.
9,	William Kirk,	do.	do.	do. do.
9,	Joseph Millward,	Laborer,	do.	do. do.
19,	Abe Jones,	Miner,	do.	Explosion of gas—injured May 9th.
22,	William Edwards,	Laborer,	Mine Hill Gap,	Explosion of gas.
28,	William Jenkins,	Miner,	Phœnix Park, No. 3,	Fall of coal.
June 11,	George Campion,	do.	Thomaston,	Fall of coal.
18,	George Derr, jr.,	Dirt bank driver,	Colket,	Fell from a mule.
22,	Amos McClure,	Miner,	Forrestville,	Skull fractured by a blast.
Sept. 6,	Henry D. Jenkins,	do.	Phœnix Park, No. 3,	Explosion of gas.
10,	Joseph Kelley,	Slate picker,	Wadesville,	Smothered to death in Pea coal chute.
11,	James Guilyn,	Miner,	Wolf Creek, "Diamond,"	Fall of coal.
Oct. 12,	James Coyle, "No. 1,"	do.	Eagle Hill Shaft,	Explosion of sulphur.
14,	James Coyle, "No. 2,"	do.	Eagle Hill Shaft,	Explosion of sulphur—injured October 12th.
Nov. 16,	Patrick Moore,	do.	Mine Hill Gap,	Explosion of gas.
Dec. 22,	George Maley,	do.	Forrestville,	Fall of coal.

DATE OF MONTH.	NAMES OF PERSONS INJURED.	OCCUPATION.	NAMES OF THE COLLIERIES.	REMARKS.
Feb. 15, . .	Henry Bambrick, . .	Miner, ...	Mine Hill Gap, ...	Burned by accidental discharge of cartridge.
15, . .	John Brennan, . . .	do.	do. do.	do. do. do. do.
17, . .	William Owens, . . .	Driver, ...	Thomaston, ...	Leg crushed by falling under a wagon.
17, . .	Robert Leppery, . . .	Fan boy, ...	do.	Fingers crushed between cog-wheels of fan.
March 13, . .	David Morgan, ...	Laborer, ...	Wadesville, ...	Run over by mine wagon—severely.
19, . .	John Shanahan, . . .	Miner, ...	do.	Explosion of fire-damp—hands and face burned.
29, . .	Daniel McGinley, . .	Inside boss, . . .	East Franklin, ...	do. sulphur—burned severely.
29, . .	Michael Brennan, . .	Fire boss, . . .	do. do.	do. do. do. do.
April 5, . .	John Dick, ...	Top man, ...	do. do.	Leg broke at top of slope.
5, . .	Daniel Evans, ...	Miner, ...	Phœnix Park, No. 2, . . .	Explosion of sulphur—severely burned.
6, . .	John Arthurs, ...	do.	do. do. do. . . .	do. do. do. do.
10, . .	James McCormick, . .	do.	do. do. do. . . .	do. do. do. do.
10, . .	William Hilbert, . .	do.	do. do. do. . . .	do. do. do. do.
10, . .	Thomas J. Davis, . .	Boss, ...	Middle Creek Shaft, . . .	do. do. from shot—severely.
10, . .	James Martin, ...	Miner, ...	do. do. do. . . .	do. do. do. do.
10, . .	Patrick Martin, . . .	do.	do. do. do. . . .	do. do. do. do.
10, . .	George Grise, ...	do.	do. do. do. . . .	do. do. do. do.
10, . .	Peter Lynn, ...	do.	do. do. do. . . .	do. do. do. do.
10, . .	Lawrence Burns, . .	do.	do. do. do. . . .	do. do. do. do.
19, . .	James Leddy, ...	do.	Wadesville, ...	do. do. severely.
19, . .	Michael Canant, . . .	do.	do. do. do. . . .	do. do. do.
25, . .	John Wilson, ...	do.	do. do. do. . . .	Fall of Slate.
May 3, . .	William Kete, ...	do.	Otto, ...	Fall of coal.
9, . .	James Leddy, ...	do.	Wadesville, ...	Explosion of gas—severely injured.
9, . .	John McAtee, ...	do.	do.	do. do. slightly injured.
9, . .	John Reese, ...	do.	do.	do. do. do.
9, . .	John Glavy, ...	do.	do.	do. do. do.
9, . .	Patrick Gibbons, . . .	do.	do.	do. do. do.
9, . .	Dennis Brennan, . .	do.	do.	do. do. do.
9, . .	Isaac Dands, ...	do.	Forrestville, ...	Fall of coal.
17, . .	Valentine Huppert, .	do.	Middle Lehigh, ...	do.
18, . .	James Brown, ...	Fire boss, ...	Phœnix Park, No. 2, . . .	Explosion of sulphur—slightly burned.
21, . .	John Moore, ...	Miner, ...	Thomaston, ...	do. gas.
22, . .	Reese Davis, ...	Fan boy, ...	Mine Hill Gap, ...	Explosion of gas—severely; since dead.
28, . .	Oscar Clark, ...	Driver, ...	Forrestville, ...	Fell under cart—leg amputated.
30, . .	George Wheeler, . .	Miner, ...	East Franklin, ...	Explosion of gas.

REGISTER OF CASUALTIES—Continued.

Date of Month.	Names of Persons Injured.	Occupation.	Names of the Collieries.	Remarks.
May 30,	William Moretta,	Miner,	East Franklin,	Explosion of gas.
30,	John Donohue,	do.	do.	do. do.
June 6,	William Haney,	do.	Pottsville Shaft,	Leg broke.
13,	John Maley,	Driver boy,	Beechwood,	Small bone of ankle broke by piece of flying coal.
13,	Daniel Fitzpatrick,	Miner,	Pine Forest,	Explosion of gas.
14,	Thomas S. Watkins,	do.	Mine Hill Gap,	Fall of coal.
15,	Christian Martz,	do.	Pottsville Shaft,	Fall of coal—severely bruised and cut, back and arms.
19,	John Bator,	do.	Richardson,	Fell down air-hole in shaft—severely.
30,	Anthony Loftus,	do.	Beechwood,	Premature explosion of blast—severely.
July 3,	Robert Britton,	do.	Richardson,	Explosion of sulphur—working with naked light against orders.
3,	John Morgan,	do.	do.	
3,	Thomas Scully,	do.	do.	
11,	John Fleming,	do.	Colkēt,	Explosion of blast.
14,	William Phillips,	do.	Mine Hill Gap,	Explosion of sulphur—severely.
26,	Patrick Hopkins,	do.	Phœnix Park, No. 2,	Fall of slate—leg and back injured.
August 7,	John Tracy,		Pottsville Shaft,	Leg broke—jammed between wagon and gangway.
14,	Oliver Derr,	Driver,	Forrestville,	Jaw fractured—caught between wagon.
17,	William Phillips,	Miner,	Mine Hill Gap,	Explosion of gas.
17,	James Bergan,	do.	do. do.	do. do.
17,	John Curran,	do.	do. do.	do. do.
18,	John Briggs,	Dockman,	Thomaston,	Caught in cage—bruised severely, hips and thighs.
21,	Morgan Jordan,	Bottom man,	Mine Hill Gap,	Leg broken—unlatching a car.
22,	Richard Neill,	Laborer,	Eagle Hill Shaft,	Fall of coal—leg broken.
28,	John Powell,	Miner,	Kalmia,	Explosion of powder; died August 30th.
29,	John Farrell,	Laborer,	Wadesville,	Fall of coal—cut about head and face.
29,	John Charles,	Miner,	Mine Hill Gap,	do. cut on shoulder.
Sept. 4,	George Morgan,	do.	Beechwood,	Explosion of sulphur.
4,	William James,	do.	do.	do. do.
4,	David James,	do.	do.	do. do.
6,	Thomas Lloyd,	do.	Phœnix Park, No. 3,	do. of gas.
6,	William Morris,	do.	do. do. do.	do. do.
6,	Elijah Hare,	do.	do. do. do.	do. do.
6,	William Evans,	do.	do. do. do.	do. do.
8,	John Landers,	do.	Beechwood,	do. of shot—cut about head and face.
14,	James Clark,	do.	Middle Creek Shaft,	Fall of slate—head, side and leg injured.
19,	Henry Waters,	do.	Beechwood,	do. coal—face and hands injured.

	19, . .	Thomas Doolin, . . .	do.	Thomaston, ...	Fall of slate—finger cut off.
	25, . .	Thomas Sharpe, . . .	do.	Eagle Hill, ...	do. coal—back injured.
	29, . .	Jeremiah Buggy, . .	do.	Richardson, ...	do. do. do. [cut.
October	1, . .	Thomas Bottomley, .	Inside driver, . .	L. & W. B. C. Co., No. 10,	Caught between bumpers of cars—finger cut off, hand
	4, . .	Bernard McArdle, . .	Miner, ...	Eagle Hill Shaft, ...	Fall of coal—hip put out of joint.
	15, . .	John McGurk, ...	do.	Pottsville Shaft, ...	do. hand mashed.
	16, . .	John Driscott, ...	do.	Pine Forest, ...	do. and slate—leg broke.
	18, . .	Peter Adamson, (boy,)	Driver, ...	Otto, ...	Leg and foot cut at bottom of slope.
	19, . .	William Holly, . . .	Miner, ...	Thomaston, ...	Explosion of sulphur.
	19, . .	William J. Williams,	do.	Beechwood, ...	Fall of coal—knee injured severely.
	19, . .	William Holly, . . .	do.	Thomaston, ...	Explosion of sulphur—face and hands burned.
	19, . .	Noah Watkins, . . .	. . . . .	L. & W. B. C. Co., No. 10,	Leg crushed—riding on water car against orders.
	20, . .	Lewis Jones, (boy,) .	Pusher, ...	Forrestville, ...	Cut about head while pushing coal.
	22, . .	Patrick Hart, ...	Laborer, ...	Thomaston, ...	Caught by running of coal in chute—head injured.
	29, . .	Thomas Maley, . . .	Miner, ...	Richardson, ...	Hand badly cut by fall of timber.
	29, . .	John Tobin, ...	do.	Pine Forest, ...	Fall of coal—back injured.
Nov.	6, . .	George Gotshall, . . .	Slate picker, . . .	do.	Both arms broken by falling off breaker roof.
	8, . .	Henry Giffle, ...	Miner, ...	Beechwood, ...	Fall of coal—back and hips injured.
	9, . .	William R. Brennan,	do.	Glendower, ...	Explosion of sulphur.
	15, . .	Thompson Pouting, .	do.	L. & W. B. C. Co., No. 10,	Fall of coal—seriously.
	15, . .	Richard Brennan, . .	do.	Phœnix Park, No. 2, . . .	Fall of timber—ankle fractured.
	19, . .	James O'Brien, . . .	do.	Forrestville, ...	Fall of coal—leg broke.
	20, . .	Patrick Gohan, . . .	do.	Wadesville, ...	Explosion of gas—carelessness.
	20, . .	John Kelly, ...	do.	Thomaston, ...	Fall of slate—back injured.
	21, . .	Thomas Hiram, . . .	do.	do.	Fall of coal—back injured.
	28, . .	John Brennan, . . .	do.	do.	do. foot injured.
Dec.	3, . .	Patrick McDonald, .	do.	Glendower, ...	Explosion of gas—burned face and hands. [cut.
	4, . .	Leonard Bickert, . .	do.	Beechwood, ...	Fall of coal—leg broken, foot badly crushed, and hand
	5, . .	William Fitzgerald, .	Starter, ...	Mine Hill Gap, ...	Hand and face cut while firing a shot.
	10, . .	Henry Pugh, ...	Miner, ...	Glendower, ...	Fall of coal—head injured.
	11, . .	Patrick Cavanaugh, .	do.	Wadesville, ...	Fall of state—arm and three ribs broken.
	13, . .	Joseph Welch, . . .	do.	Glendower, ...	Fall of coal—ribs broken.
	13, . .	Robert O'Neill, . . .	do.	Forrestville, ...	do. collar-bone broken.
	15, . .	James Wilson, ...	Starter, ...	Mine Hill Gap, ...	Fall of rock—foot smashed.
	17, . .	William Crawley, . .	Miner, ...	Kalmia, ...	Fall of coal.
	24, . .	Michael Hoben, . . .	do.	Mine Hill Gap, ...	Explosion of gas—ribs and head hurt.
	24, . .	James Kaedner, . . .	do.	do. do.	do. do. do.
	24, . .	Peter Holden, ...	do.	Thomaston, ...	Explosion of shot—face hurt and injured about body.
	24, . .	Patrick Boner, ...	do.	L. & W. B. C. Co., No. 8, .	Fall of coal—leg broke.

Tonnage of Coal produced in First District, 1877.

COLLIERY.	Tonnage, 1876.	Tonnage, 1877.
Anchor,	29,875.15	2,076.11
Beechwood,	57,617.07	103,192.00
Colket,	11,209.01	24,726.00
East Franklin,	27,641.08	48,367.02
Eagle Hill,	34,547.02	32,219.06
Forestville,	21,382.17	49,317.13
Glendower,	23,600.19	58,497.15
Mine Hill Gap,	74,157.11	105,213.05
Middle Creek Shaft,	24,927.05	31,361.15
Otto,	26,294.11	89,989.09
Phœnix Park, No. 2,	25,001.06	31,769.06
Pine Forest,	31,537.19	53,073.06
Pottsville,	25,020.19	48,501.09
Richardson,	6,898.18	62,238.16
South Pyne,	. . . . .	11,928.14
Thomaston,	60,631.04	81,543.16
Wadesville Shaft,	48,810.03	150,261.11
Kalmia,	55,555.08	99,887.09
Rausch Creek,	54,299.12	37,885.00
Lincoln,	62,498.18	74,188.08
Swatara,	541.14	609.15
Pyne,	17,562.15	10,319.00
Lewis Tract,	230.00	127.10
White Oak,	7,542.04	5,952.19
Ellsworth,	9,595.01	5,856.08
Gettle & Wagner,	468.13	344.06
Chandler,	190.00	56.05
St. Clair,	1,998.05	491.11
Alaska,	82.08	67.18
Phœnix Park, No. 3,	22,488.05	22,427.09
Tremont,	291.00	1,549.07
Small operators,	3,395.00	72,562.10
Eagle,	43,389.02	50,065.05
Palmer Vein, (operated three months,)	. . . . .	17,240.00
Lehigh Coal and Navigation Company,	. . . . .	196,871.07
	809,281.19	1,580,780.00

Employees First District, September, 1877.

Colliery.	Outside.		Inside.		Total.		Total number of employes.
	Men.	Boys.	Men.	Boys.	Men.	Boys.	
Newkirk,	1	....	....	....	1	....	1
Buckville,	1	....	....	....	1	....	1
Eagle Hill Shaft,	40	38	151	11	191	49	240
Pine Forest,	33	36	101	10	134	46	180
Rainbow,	8	....	....	....	8	....	8
Pottsville,	47	67	160	29	207	96	303
Wadesville Shaft,	53	100	365	52	418	152	570
Beechwood,	56	58	203	28	259	86	345
Mine Hill Gap,	49	78	122	28	171	106	277
Pine Knot,	2	....	....	....	2	....	2
Anchor,	3	....	....	....	3	....	3
Thomaston,	45	84	152	22	197	106	303
Richardson,	36	45	144	16	180	61	241
Glendower,	34	62	128	12	162	74	236
Taylorsville,	14	....	....	....	14	....	14
Forestville,	28	54	112	28	140	82	222
Phœnix Park, No. 2,	27	35	78	9	105	44	149
Otto,	43	84	164	19	207	103	310
Pyne,	20	29	42	3	62	32	94
Middle Creek Shaft,	23	21	103	11	126	32	158
East Franklin,	26	38	57	10	83	48	131
Colket,	28	35	98	11	126	46	172
Rausch Creek,	70	37	196	15	266	52	318
Palmer Vein,	28	19	68	....	96	19	115
Eagle,	21	35	92	17	113	52	165
Lehigh Coal and Nav. Co.,	184	266	369	229	553	495	1,048
Small operators,	....	....	....	....	....	....	241
	920	1,221	2,905	560	3,825	1,781	5,847

Causes of Accidents.	Killed.	Causes of Accidents.	Injured.
Run over by mine wagon at bottom of slope,	1	Accidental discharge of cartridge,	2
Explosion of sulphur,	4	Falling under mine wagons and carts,	3
Natural causes,	1	Explosion of fire-damp,	1
Caught under pump-rod,	1	Explosion of sulphur,	24
Fell down slope while working at column pipe,	1	Explosion of gas,	19
Breaking of chain in slope,	1	Explosion of blast,	2
Fall of coal,	5	Explosion of powder,	1
Explosion of gas,	10	Explosion of shot,	1
Fell from a mule,	1	Fall of slate,	4
Skull fractured by a blast,	1	Fall of coal,	17
Smothered to death,	1	Running of coal in chute,	2
		By machinery,	9
		By accidental breaking of limbs,	4

Coal produced in tons per year, and number of persons employed in 1877.

REMARKS.	1877.
Coal produced in tons per year,	1,580,780
Number of persons employed,	5,847
Ratio of coal produced per person employed,	270
Number of lives lost per year,	29
Ratio of coal produced per life lost,	54,510
Ratio of persons employed per life lost,	202
Number of persons injured per year,	111
Ratio coal produced per person injured,	15,151

It now becomes my painful duty to refer to the most serious and fatal accident of the year, which occurred at Wadesville shaft, on the 9th of May last, and in doing so, I shall enter fully into all the details of that fearful catastrophe, not only for the purpose of giving all the particulars, so far as they came under my observations in the examinations made by me, but also in the earnest hope that those miners who may read this report may realize the importance of the fact that it is far better to obey the orders of their superiors than to trust to their own judgment, and in doing so I submit three maps, showing, in plate "1," a ground plan of the colliery on a small scale, showing the extent and character of the workings under ground. Plate "2," a ground plan on a large scale, showing the locality of the explosion and the ventilation thereof in detail. Plate "3," a sectional sketch, showing the method pursued to clear the old workings of standing gas in the region of the explosion, and the strata immediately above the Mammoth vein.

The Wadesville Shaft Colliery is near the mining village of Wadesville, about three miles north of Pottsville, and has been in operation since the year 1868. The shaft, which is six hundred and sixty-four feet deep, reaches the Mammoth seam at that point, is used as the coal outlet, and also the down-cast or air intake. The second outlet, which is required by law as a means of egress from the mines in case of an accidental obstruction in the down-cast, is used also as the upcast airway, and is shown on Plate No. 1, marked air shaft "upcast."

The Mammoth, (colored in red,) and the seven-foot, (colored in blue,) Plates "1" and "2," are the only seams that have been worked from the shaft, the former being twenty-five feet thick and the latter eight feet six inches thick, with six feet of slate between. See Plate "3."

A lift of coal was developed by the shaft extending from its foot up a pitch, varying from ten to twenty degrees, to the red workings of the Hickory slope. See Plate "1."

The plan pursued to mine this coal was to drive two gravity planes, marked respectively east, or old plane, and west, or new plane, Plate "1," directly up the pitch to such points as would be favorable to turn gangways, from which the upper portions of the territory could be worked, the

WASLEY'S SLOPE
(ABANDONED)
OUTCROP OF MAMMOTH VEIN
L E E L
OUTCROP OF SEVEN F
AIR SHAFT
(UPCAST)
MONITOR COLLIERY
(ABANDONED)
Primrose Vein
MT LAFFEE TRACT
EAST FLOWERFIELD TRACT
ELLMAKER TRACT
WEST FLOWERY FIELD TRACT
FAULT
WINZE
(DOWNCAST)
WADESVILLE SHAFT

PLATE 1.

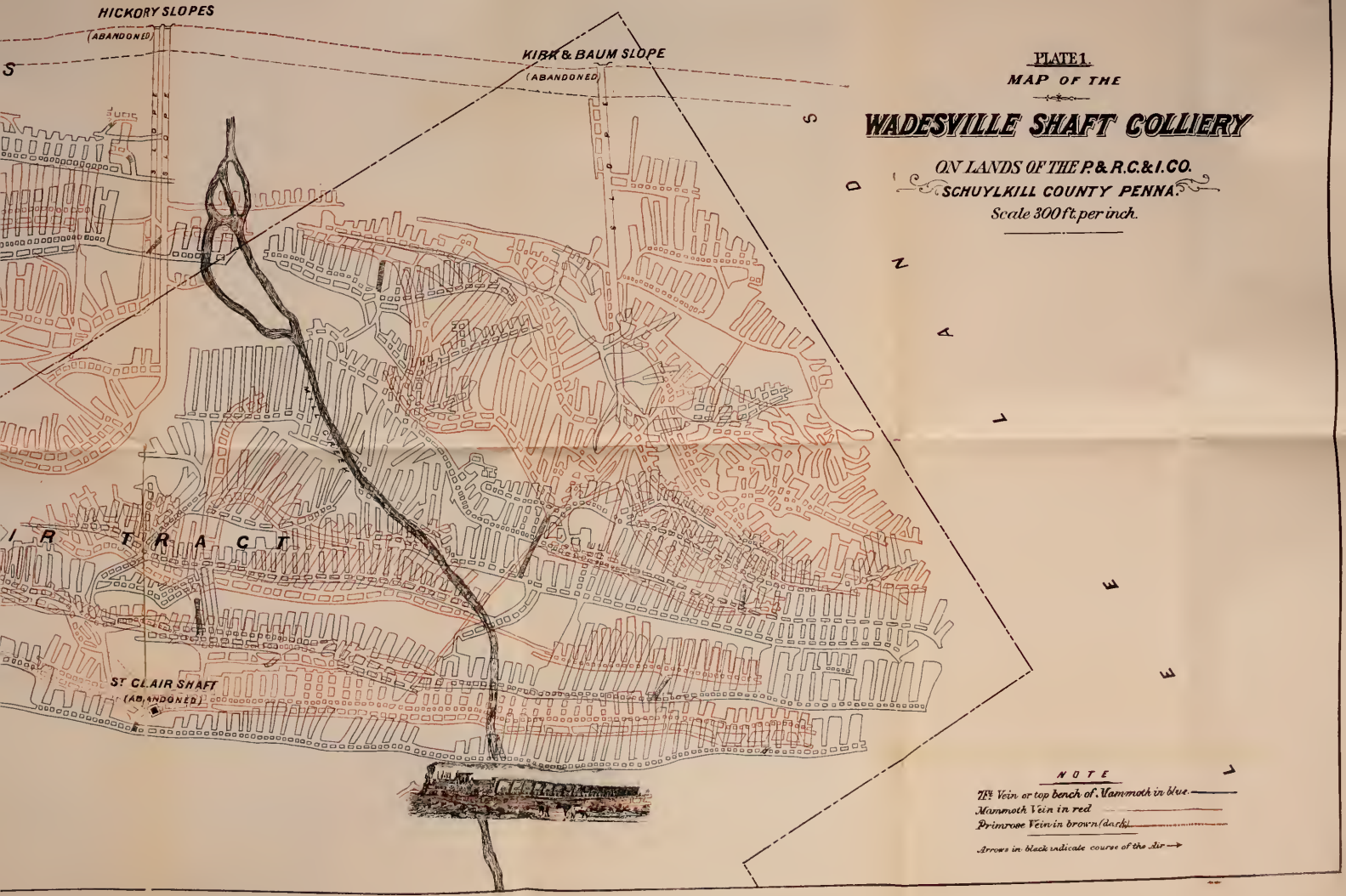
MAP OF THE

WADESVILLE SHAFT COLLIERY

ON LANDS OF THE P. & R. C. & I. CO.

SCHUYLKILL COUNTY PENNA.

Scale 300 ft. per inch.



gangways extending east and west to the limits of the mining right. When the coal above these gangways was exhausted, others were started from the same planes at lower levels, and others again when they were exhausted.

In 1876, Lundy's gangway, (Plates "1" and "2,") had been driven to a fault, at which it was decided it should be stopped, and that the gangway should be robbed back, and all the coal taken from it that could safely be mined before abandoning work at this level. From the time the seams worked were opened by the shaft, they have always given off large quantities of fire damp, and it was necessary that in the robbing, provisions should be made to remove all the gas as fast as generated, not only where the men were at work, but also in those parts already exhausted, in order to prevent an accumulation there which might, by some accident, be forced in upon the men suddenly and cause an explosion. An air-way, marked "intake air-way," Plate "2," was driven nearly to the gangway face, and also a "return air-way," both of which were kept separate from the gangway by means of sufficient pillars of coal between, and batteries and doors put in wherever required to force a current of air through the intake around the face of the gangway and out at the outlet to the fan.

As the seven-foot seam (not at the western extremity of Lundy's gangway in a workable condition) was close above the Mammoth, the slate between frequently broke down, and sometimes the seven-foot coal also in these air courses; and wherever this was the case, there was a large opening left above the air course, in which fire damp (evolved in especially large quantities from the seven-foot seam) could accumulate. This was prevented by the erection of slanting batteries, left open at the top, which caused the current of air to sweep upward into the opening and carry away any gas that might exist there. See plate "3." An examination of plate "2" will show that as long as the robbing was so conducted as to maintain the current of air in the direction shown by the arrows in black, and the doors and batteries there shown were kept intact, men could work with perfect safety in Lundy's gangway, and along the intake air course; but it will readily be seen that if two doors or batteries, or one of each, were removed or rendered inoperative, the current of air might be caused to cross from the intake to the outlet without sweeping around the face of the gangway, and the portion thus deprived of ventilation would necessarily accumulate explosive gas. The current of air that was passed around this portion of the work was forty thousand cubic feet per minute, and the greatest confidence in their freedom from danger was felt by the men there at work, and by the officers of the colliery. While it was not, under ordinary circumstances, considered necessary that the men should work with safety lamps exclusively, they were furnished with them, and instructed to use them on cloudy days, when the barometer was likely to be falling, and when any falls of rock or coal were heard which might in any way temporarily check the ventilation, and they were further instructed that

after such a fall they were to leave their working places and were not to reënter them again until after an examination had been made by the fire boss assigned to that section of the colliery. The robbing, under these circumstances had been successfully carried on for several months, and had progressed, on May 9, 1877, as far as the door marked "A" on plate "2." At this point, Joseph Millward and Benjamin Mosely were employed robbing the gangway; Herbert Moore was robbing the intake air course about opposite to them; Edward Weaklam was loading coal at the point "C;" William Kirk and Michael Farrel were robbing at "4;" Thomas Conners and James McAtee were robbing at "5," and John Durkin and William Hirten were repairing air course at about "6." The door at "A" was considered of especial importance to the ventilation, as well as the battery at "B," and instructions regarding them had been carefully impressed upon the men and drivers. The door was not to be left open longer than absolutely needed for the passage of men or wagons. No coal was to be taken from within a certain distance of the battery, nor on either side within a certain distance of the door. The door had been further secured by relief timbers near it a few days before, and the heading in which the battery was located had been filled with rock and dirt, to prevent a crush, should one occur, permitting the air to pass through it.

On the afternoon of the 8th of May, the door, at "A," was removed by some of the men then at work; and at some time during the afternoon, or early on the morning of the 9th, the pillar, at "B," was so far cut through, as to allow the air to pass through it. The current of air, therefore, instead of passing around the gangway-face, as shown by the arrows in black, took the course shown by the arrows in blue, viz: Through the heading, at "B;" through the opening where the door had been, at "A," and thence into the return air-course. Thus it will be seen, that a length of air-way, from "B" around the face of the gangway to the point marked "Fall of Coal," Plate 2, was deprived of ventilation, in which explosive gas could accummulate, and if not removed, would eventually fill it entirely. At about ten o'clock, on the morning of the 9th of May, the mining boss, while on his way to pay his daily visit to that portion of the work, and about three hundred yards distant, heard a fall, and after a few seconds, an explosion. At the time of the fall, Herbet Moore was unloading a buggy, at the point "C," where Edward Weaklam was working, and had the door at "C," Plate 2, open. Hearing the fall, they called up to Millward and Mosely, at "A," o know what it was, and received a reply to the effect that it was nothing serious. Herbert Moore then started to return to his working-place. While the door, at "C," stood open, the course of the air would be that indicated by the arrows in red; and the fall, causing a temporary check in the current of air, or, perhaps, even a pressure against the current, forced a portion of the gas accumulated above "B" down the in-take airway to the point 2, at which it is believed to have been ignited by Herbert Moore's naked light, while on his return to his working-place, pushing the empty

PLATE 2.

SURVEY OF A PORTION OF THE

WADESVILLE SHAFT COLLIERY

Showing the Mine Workings and Ventilation of the Locality where an Explosion of Fire Damp occurred

MAY 9TH 1877

Scale 60 ft. per inch

KEY TO PLAN

- 1 Joe Millward was working and found dead
- 2 Herbert Moore " " " "
- 3 Ben Mavely " " "
- 3' " " " "
- 4 Wm Kirk " " " "
- 5 Thos Conners " "
- 5' " " "
- 6 John Durkin " " "
- 6' " " " Unhurt

BATTERIES Nos 1 2 3 & 3A6 are so constructed as to cause the current of Air to pass near the top

ARROWS in Blue indicate course of the Air after stone at A and coal at B were removed

NOTE

ARROWS in Red indicate course of the **AIR** while Herbert Moore was unloading waggon at C and had the Door open

ARROWS in Black indicate the proper course of the **AIR**

buggy before him. It may have been, that the door, at "C," being partially filled by the buggy, did not permit all the air to pass through it, but that a portion of the current took the course indicated by arrows in blue; in which case, the gas must have been ignited by the men working with naked lights, at "A."

Joseph Millward, Herbert Moore, William Kirk, Thomas Conners, and John Durkin, who had come on the gangway from his working-place, at "6," for some material required, were instantly killed. Edward Weaklam saw the flash in the direction taken, a moment before, by Herbert Moore, and, throwing himself down, seized the rail, until the force of the explosion passed over him, when he made his way out in the dark, to a place of safety, as did also Michael Farrell, James McAtee, and William Hirten. Benjamin Mosely must have endeavored to do the same, but, becoming confused in the excitement and darkness, or becoming so overcome by the after-damp, as to lose partial consciousness, he turned to the right, into one of the breasts, instead of keeping in the direction of the gangway, where he was smothered by the after-damp.

After the explosion, a large piece of coal, (marked fall of seven-feet coal, Plate 2.) was found to have fallen, and there is little doubt that this was the immediate cause of the accident.

What amount of gas had accumulated in the portion of the intake and return air-courses, deprived of ventilation, is, of course, unknown; but, if it had been entirely filled with fire-damp, in an explosive condition, unquestionably all the men then at work in that section of the colliery would have been lost.

I have thus, I think, given a clear and concise statement of the causes which led to this terrible accident, by which six lives were lost that were valuable to the community, lost through a want of foresight and intelligence in utilizing the means that were amply furnished for their security. Mining is necessarily a dangerous calling, but its necessary dangers are very much increased by a lack of intelligent coöperation on the part of the workmen, with the endeavors of the employers to provide for their safety. A few wagons of coal, taken where convenient to mine, and contrary to the orders of the boss, does not appear to be a serious matter; a system of ventilation, depending upon a door, which it is found to be too much trouble to open and shut, or the coal around which can be cheaply mined, has hitherto ventilated the locality well, and the removal of the door is not supposed seriously to affect its operation. Notwithstanding that it is directly disobeying the bosses' orders, the coal is removed, and also the door, a fall occurs at an inopportune moment, and the legitimate consequence takes place.

Much is now done to furnish a supervision, by means of bosses and under-bosses and fire-bosses, so close as to counteract, in a great measure, such a tendency, but the event has proven, on many occasions, that this alone will not answer all the requirements of the case, and that it is neces-

sary for the men to take some heed to their own safety. It is surely not beyond the reasoning power of any working man to decide that if he works at a colliery his first duty is to obey the orders of the boss, and when he considers that not only his own safety, but also that of many others, friends, companions, and, it may be, relatives, working near him together, both the welfare of his and their families may depend upon his doing so, it would seem impossible that any one possessed of powers of reflection should act otherwise. In ninety-nine out of one hundred of the collieries now in operation in Schuylkill county, the means provided for the safety of the men are fully ample to provide for any known contingencies, and if the men themselves would let me say to them, do nothing contrary to orders, nine out of ten of the fatal accidents would be avoided.

Ventilation.

Although this is a word that is used as often as any other, in the coal regions, and also one that is most important to our miners and operators, it is probably less understood among the parties most interested, than people outside of this locality would believe.

It would naturally be supposed by outside parties, that people whose health and life depend upon their knowledge of the principle of the difference of the pressure of the atmosphere, would endeavor to become acquainted with the laws of nature, which contribute to the creation of what is called a current of air in coal mines. In such knowledge our mining population are deplorably deficient, and, therefore, for the information of such a portion of the parties engaged in mining, who desire to become acquainted with these laws, I append the following remarks.

Most men who have worked in coal mines, or who have in any way been connected with the workings of them, are aware of the fact that as soon as a seam of coal is struck, it evolves gases of some kind or other—these gases having been generated thousands of years ago, by the decomposition of vegetable matter. The chemical composition of these gases are to them unknown, and so far as they are practically concerned, it is only necessary that they should be acquainted with their dangerous properties. Unfortunately, they become too familiar with the consequences of coming in contact with them.

Fire-damp, or light carbureted hydrogen gas, in a pure state, is non-explosive; but when mixed with a certain proportion of atmospheric air sufficient to supply enough oxygen to maintain combustion, if brought in contact with a flame, ignites, and has a tendency to expand, upon ignition, to many times its original volume. The gas, while in a state of combustion, emits a quantity of heat which is of three-fold more intensity than that evolved by the combustion of anthracite coal in any stove with which we are acquainted; consequently, when an explosion of this gas occurs, persons exposed to its influence become burned in a terrible manner. The best method which has at present been discovered for the prevention of such accidents in coal mines, is an adequate supply of atmospheric air,

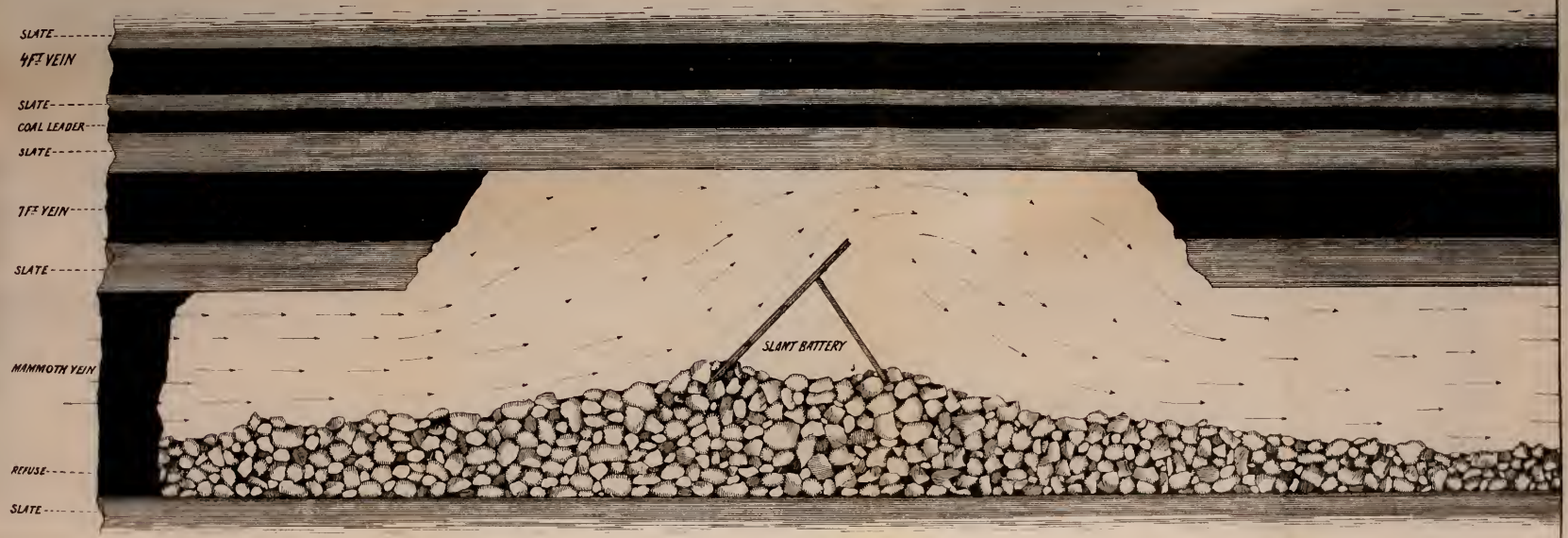


PLATE 3.

SKETCH SHOWING THE CONSTRUCTION OF BATTERIES NOS. 1.2.3.4 & 5. ON A MAP ENTITLED

SURVEY OF A PORTION OF THE WADESVILLE SHAFT COLLIERY

Showing the Mine Workings and Ventilation of the Locality where an Explosion of Fire Damp occurred

(MAY 3rd 1877)

SCALE 10⅓ Ft PER INCH

and when we consider that by a bountiful providence we are supplied with an unlimited quantity of this element, it appears strange that it is not so utilized as to prevent the possibility of an accident arising from the ignition of the gas, after being compelled by circumstances to adopt some method of supplying, by artificial means, a quantity of air sufficient to enable the owners of collieries to take out the mineral which is so essential to the comfort and well-being of the human race.

Various methods have been applied. The two most important of such appliances are as follows:

First.—An air furnace, as it is technically termed, which, by the application of heat, so rarifies the air in the upcast opening, or outlet, of the mine, as to disturb the natural equilibrium which is caused by the equal pressure of the atmosphere. This pressure amounts to fourteen pounds and a fraction per square inch of the surface exposed to its influence. Now it is evident that if the dimensions of the two outlets are equal, and the height of the columns equal, there will be no current, as the pressure is equal on both sides; but if, by any means, any part of the weight can be removed from one side, the air will be forced through the caverns of the mine at a velocity proportional to the quantity of weight so removed.

It has been proven, by very careful experiments, that four hundred and fifty-nine cubic feet of air at zero of Fahrenheit thermometer, the pressure of the atmosphere being constant, will expand $\frac{1}{459}$ths of its volume for every degree of increase of temperature, as indicated by said instrument, and as the specific gravity of the air varies in an inverse ratio with its expansion, it will readily be seen that by the application of heat, the column of air on one side would not be so heavy as it would be on the other side; and the difference of weight produces a movement or current of air which, if intelligently directed and carried to every working place in the mine in sufficient quantities, would render innocuous all the dangerous gases which have been generated by the fermentation of compressed vegetable matter, and emitted after the coal vein has been opened, at a ratio proportionate with the weight of the superincumbent strata, and the resistance, opposed by the pressure of the atmosphere.

In accordance with this law of nature, this principle has been applied and used in coal mines on the continent of Europe for many years, but some fifteen years ago another system of ventilation was adopted, which, in its practical application, has proven to be far superior to furnace ventilation, as it removes the pressure from one column without being liable to the danger of setting fire to the coal in the mine, or igniting inflammable gases which have been accumulated in the workings, and by passing over the furnace in large quantities have been the cause of many accidents.

This method is known among our mining population by the name of the suction fan. This word *suction*, as it is generally understood, would imply that by mechanical means the air would be drawn from the mine, together with all gases that have accumulated therein; but this idea is

erroneous, as all that the fan can possibly do is to create a vacuum over the aperture which is called the upcast opening of the mine. The air is then forced through the mine by the natural pressure which exists on the other side. When we understand this fact, it is evident that after a perfect vacuum has been created any additional power applied to the fan is useless, and will not add one iota to the quantity of air passing through the mine; therefore, when it becomes necessary to increase the quantity of air passing through a mine, it is absolutely necessary that all the passages within should be enlarged in proportion to the extra power which is supposed to be necessary to procure an increased quantity of pure air to pass through the mine. But the most important factor, and at the same time the least understood in the ventilation of mines, is the resistance opposed by friction. In the open air a difference of pressure of one pound per square foot would, by the force of gravity, cause a movement in an opposite direction to the heaviest side, at a velocity of nearly twenty-nine feet per second, but when the current is forced through the contracted openings and rugged obstacles with which it comes in contact during its passage through the mine, its velocity is very materially decreased.

At the best ventilated colliery, where scientific experiments have been made in England, it has been proven that seven eighths of the power used to procure ventilation is expended to overcome the resistance offered by friction. On an average, in our anthracite mines, no less than nineteen twentieths parts of the power used is expended for a similar purpose.

A knowledge of these facts should teach our superintendents and foremen of mines that it is of vastly more importance that all the air-passages in the mine should be enlarged and rendered as smooth on the surface as is consistent with the physical circumstances surrounding the mine, than it is to increase the power or add to the size of the fan.

SECOND SCHUYLKILL DISTRICT.

Office of Inspector of Coal Mines,
Shenandoah, Pa.

To his Excellency, John F. Hartranft,
Governor of the Commonwealth of Pennsylvania:

Sir: As inspector of mines for the Second Schuylkill district, I have the honor to lay before you my annual report for the year 1877, on the workings of coal mines, in accordance with the general act of Assembly of 1870, with a schedule of accidents, both fatal and non-fatal, that have occurred during that period; also, a list of collieries comprising the Second Schuylkill district, with the amount of coal produced by each colliery, and number of persons employed therein; also, the amount of coal produced for each life lost, and some other matters, which, I hope, will not be out of place.

The total number of persons killed during the year, from all causes, was thirty-three, which was the result of thirty-two separate accidents. Two persons have been killed by the same fall. From falls of roofs and coal, twenty persons were killed—two from falls of roof; eighteen from falls of coal; three from explosions of powder; one by being caught under cage, at the bottom of the shaft; one by machinery in the breaker; one fell from trestling at breaker; two caught by mine cars inside; one by a piece of coal flying from a shot; four died from the injuries received after the accidents occurred, making a total of thirty-three.

There have been 3,805,467 tons of coal produced this year, against 2,891,117 the previous year; 3,590,064 of the total amount was shipped to market by rail; 215,403 tons were used and sold at mines for local consumption. The ratio of casualties are, one fatal accident for every 115,317 tons of coal produced, against 107,078 the previous year; one person received injuries for every 65,611 tons, against 60,231 tons of the year of 1876. There were 10,537 persons employed this year, against 10,218 of the year previous.

Numerically, the number of deaths show an increase this year over that of last, whilst the output of coal has been increased 914,350 tons above that of the last year.

The number of collieries in the district, is fifty-six, of which forty-nine only produced any tonnage this year. Twelve of the number produced 108,225 tons. Thirty-seven collieries, produced 3,697,242 tons, making the average output of the thirteen collieries 99,925 tons.

The output for each person employed in and about the mines, was three hundred and sixty-one tons, against two hundred and eighty-two tons the previous year, being an increase of seventy-nine tons as compared with that of last year.

For every three hundred and nineteen persons employed, one person lost his life.

I have the honor to be,
Your Excellency's obedient servant,
SAMUEL GAY.
Inspector of Mines.

SHENANDOAH, *December 3, 1877.*

Ventilation.

I am pleased to be able to state that there is a decided improvement in this branch in most of the mines in this district; but, nevertheless, there still remains some few which have not the currents of air carried up to the face of the working places in such large quantities as I desire. This latter trouble is in mines which do not generate fire-damp, or where the inside foreman still clings to the old customs, and oftentimes where owners are too penurious or unmindful of the health and safety of persons in their employ. These parties are always ready with an excuse, and generally the first is there is no danger, there is no explosive gas here, and treat a matter of this kind with indifference, where the lamp burns freely, and no sudden death ensues, never thinking for a moment that there are other gasses given off, which are much more deceptive than either carbonic acid or carbureted hydrogen gas. The gas I here allude to is what is called by chemists carbonic oxide, and commonly called by miners white damp; this gas is not explosive, and the lamp burns freely, therefore, we say it is more deceptive than either of the gases above mentioned, as their presence can be detected, whereas the other cannot, unless it is through a scientific process. This gas is only known to exist where powder is used for blasting purposes, which is a well known fact; that there are large quantities used in all of our anthracite mines, hence large quantities of this gas must be also given off; therefore, it becomes highly important that not only mines which generate explosive gases should be well ventilated, or have large quantities of air sweeping around the face of each and every working place, to render harmless all noxious gases.

This applies much more strongly to the anthracite than to the bituminous coal mines, which, as I before stated, is due to the large amounts of powder used.

In I. J. Atkinson's work on gasses met with in coal mines, he says: "Carbonic oxide (white damp) has a much more deleterious effect on the animal economy than carbonic acid; air which contains only one per cent. of carbonic oxide almost immediately causes the death of warm-blooded animals, as has been shown by the decisive experiments of M. Felix Le-

blanc. Carbonic oxide is itself an inflammable gas, but does not support the combustion of other bodies. It has no taste, but has a peculiar odor. Small animals immersed in it die instantly. When inhaled, it produces giddiness and fainting fits, even when mixed with a fourth of its bulk of air."

I have referred to this subject perhaps more minutely than I should have done, had not two cases, where persons were overcome by carbonic oxide, or white damp, come under my own observation this year, and would have proved fatal without a doubt, had it not been for the acute angle, which was about thirty-five degrees, and when they fell from the effects of breathing this noxious gas they rolled down on the gangway, which, happily, was only a few feet distant, and both escaped without receiving any severe injuries. One of these men was brought to the surface in an unconscious condition, and when I told the man it was the effects of breathing impure air, he told me the air was good, for the lamp burned freely.

I am strongly of the opinion that there have been occurrences of this kind where the result has proved fatal.

Explosions of Gas.

Seven persons were injured from this source, happily none of which were fatal. In one case only were the injuries received of a very severe character. Most of the others were very slight. Two of these persons were burned when returning to the face of their working place, after firing a shot, without taking their safety lamp to make the necessary examination. Two others were burned whilst they were in the act of putting in a length of manway, which served as a brattice. Knowing that there was a small amount of gas standing in the place, still this work was being done with a naked light, or lamp; and, as might have been expected, as they were putting on the last plank, which conducted the current nearer the face, carrying the gas with it, the explosion took place.

Two others were burned by entering their place in the morning before it had been examined by the boss or his assistant. This mine did not generate any large quantity of fire-damp. Still there was enough to require the careful attention of the officers in charge of the mine. Believing these officials were not giving this matter the necessary attention to insure the safety of the workingmen, I gave it more attention than I should otherwise have done. Whenever I visited the colliery I always called the attention of the proper official to this matter, telling him the consequence should any person get burned through his neglect. None of these admonitions seemed to have the desired effect. I called him before some of the work men, telling him, in their presence, that the mine was not safe for men to enter without the workings being examined to see that all places were free from gas. Notwithstanding all this, a few days after that time men were allowed to enter one of these places, and the result was that two men were burned. In this case I entered suit against the inside foreman, and the case was tried before his Honor Judge Pershing, and the boss found guilty. As

his Honor was about to pass sentence, I asked the court to be as lenient as they possibly could, it being the first case of violation of the mine law in which any person had been convicted. To which his Honor replied, stating that my request had changed the sentence very materially. The court had determined to inflict a very severe sentence, but, in view of my application, sentenced him to thirty days' imprisonment, fifty dollars fine, and the cost of prosecution. I was very sorry to be compelled to resort to this remedy, but it has had a good effect on the whole district, and I am fully convinced that it has been the means of avoiding one explosion, if not more, by which several persons might have lost their lives.

Accidents from Falls of Coal.

This is the greatest source from which I have the painful duty to chronicle a very large percentage of the accidents, both fatal and non-fatal. Unfortunately some of these unfortunate occurrences were purely accidental, and might have happened to the most skillful and cautious workman. Others, however, could have been avoided by the exercise of more care and caution on the part of the sufferers themselves. It was shown by the testimony taken at the several inquisitions, held by the coroner and by myself, that in nine of those accidents, whereby ten persons lost their lives, the men had been warned of their danger, and their attention directed to the dangerous condition of the coal they were working under. Still, they persisted in risking their lives, which resulted in what is very commonly called accidental death, but oftentimes might very properly be called suicide.

There has been no lack of prop timber lying outside at the mines, and no case of complaint has come under my observation; but I do not hesitate to say that there has been a great lack of its use in places where the accidents occurred. In some of the cases timbers could have been used only temporarily, whilst in others permanent props should have been placed. I do not wish to place all blame on the miner. Sometimes I am inclined to think the fault lies with the foremen, who do not thoroughly examine the working places, or who are content, if they apprehend danger, to point it out, instead of seeing that the instructions they give are carried out.

That the amount of attention necessary to see that these places are properly, or carefully secured, is not given, abundant proofs are shown at many of the inquests held, and by the statistics which accompany this, and my last year's report, it will be seen that too much is left to the men themselves in the matter of securing their working places. I am sorry to say, that there is a very large number of men employed as miners in our anthracite mines who are incapable of securing their working places. Therefore it makes it very important that their places should be carefully examined by thorough practical men, who have the power to enforce the securing of all dangerous places. Such examination should be made at least twice a day. Were this done, we should have fifty per cent. less accidents from falls of coal.

In justice to a large majority of the inside foremen, I will here say that the duties imposed upon them are too great, and require some alteration, particularly in mines which do not generate explosive gas. On them alone generally depends both mining and transportation through all of its various branches, and, as a matter of course, the getting of coal out, is considered one of the first duties. The security of the working places, and the safety of the workingmen, seem to be a second consideration.

Of course, this state of things does not exonerate these officials from seeing that all working places are carefully secured. The law of this Commonwealth imposes those duties on all inside foremen, and it is imperative that they should do so. As I before remarked, in a number of instances the men's attention had been directed to the dangerous condition of the places which they were working under, but these warnings were not given by those in authority whose duty it is to see that the places are property secured, but by their fellow workmen, hence no notice was taken of such admonitions.

In one of these cases, accident No. 21, it was proven at the inquest that the inside foreman had not visited the working place for four days previous to the accident. This mine does not generate explosive gas.

Nevertheless, we know the number of accidents occurring from falls of coal and roof far exceeds the number occurring from fire-damp explosions. On these grounds, I have been trying to impress upon the minds of the officials the grave importance of careful examinations being made of all working places.

There seems to be a doubt existing in the minds of most of the mine officials as to how often these examinations should be made where fire-damp is not generated. There is no doubt whatever in my mind, that it is the intention of the law that these places should be examined at least once every day, or as much oftener as circumstances require. On these grounds, I determined to bring this case before court, with the hope that all doubts would be removed from the minds of all parties interested.

Hence, the inside foreman and the miner, who escaped, were put under $3,000 bonds for their appearance at court. I failed in my effort to bring this matter to a successful issue, not through any fault of mine, but owing to the grand jury ignoring the bills, which might appear to be through a want of knowledge of the requirements of the law which impose these duties on the mine officials. I explained this matter to them, and referred them to eighth section of the mine law.

Although I did not accomplish the desired object, I am pleased to state that it was not without a good effect. I will furthermore state that the case was not in any way aimed (personally) at the foreman, but at the evil which existed.

By examining the accompanying sketch, it will be readily seen how many accidents occur, and the causes thereof, to which I have referred briefly in this report. By looking at sketch No. 1, line A B, marked thus

⊕ ⊕, which represents the last line of props, which shows on sketch two, line D C, twenty feet two inches from face. The triangular diagram on sketch one shows the outlines of the fall, being two feet five inches thick. Sketch three represents cross section on line A B. It will be plainly seen by any practical man, that this accident was caused by insufficient propping, which caused the death of Andrew Foy, accident number twenty-one. This is one of the cases which I have before referred to, endeavoring to bring it before the court, but did not succeed, as the bill was ignored by the grand jury.

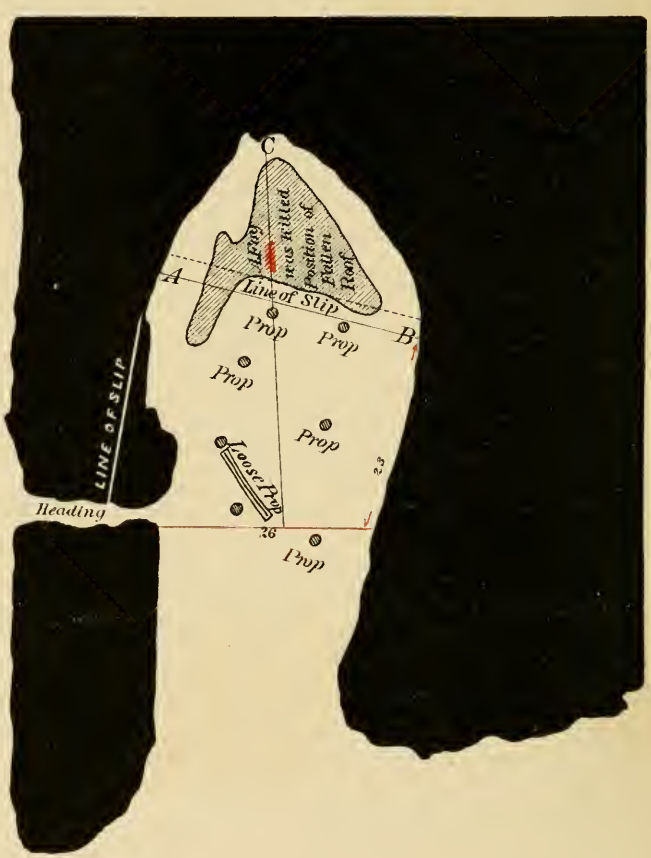
List of FATAL ACCIDENTS in the Shenandoah District, Schuylkill County, Pa., for the Year ending December 31, 1877.

Date.	No. of accident.	Name of Colliery.	Location.	Name of Agent or Owner.	Persons Killed.	Cause of Accident.
Jan. 13,	1	St. Nicholas, . . .	St. Nicholas, .	St. Nicholas Coal Company,	Thomas Sheeken,	Igniting a keg of powder.
15,	2	West Shenandoah,	Shenandoah, .	Philadelphia and Reading Coal and Iron Company,	Michael Mulhall,	Caught under cage.
Feb. 13,	3	Indian Ridge, . . .	Shenandoah, .	Philadelphia and Reading Coal and Iron Company,	John Cosgrove,	Fall of coal.
Mar. 20,	4	William Penn, . .	William Penn,	William Penn Coal Company,	John Maloy,	Fall of coal.
27,	5	Knickerbocker, . .	Yatesville, . . .	Philadelphia and Reading Coal and Iron Company,	Martin Clarke,	Fall of coal.
April 10,	6	Turkey Run, . . .	Shenandoah, .	Haas, Brenizer & Co.,	Martin Maley,	Breaker machinery.
28,	7	Colorado, ...	Colorado, . . .	Philadelphia Coal Company,	John Carr,	Fall of coal.
May 8,	8	East Mahanoy, . .	Mahanoy City,	Focht, Whittaker & Co.,	Daniel Curtin,	Crushed by mine car.
12,	9	William Penn, . .	William Penn,	William Penn Coal Company,	Henry Eckley,	Fall of coal.
June 10,	10	Mahanoy City, .	Mahanoy City,	Philadelphia and Reading Coal and Iron Company,	Benjamin Clemson,	Fall of coal.
13,	11	Girard Mountain,	Raven Run, . .	Girard Mammoth Coal Company,	Edward Davis,	Fall of coal. [from a shot.
July 12,	12	Lehigh, No. 3, . . .	Shenandoah, .	Philadelphia Coal Company,	Edward Dowd,	Struck by piece of coal flying
17,	13	Bear Run, ...	St. Nicholas,	Wiggan & Triebles,	Harrison Davis,	Fall of coal.
27,	14	Koh-i-noor, ...	Shenandoah, .	Richard Heckscher & Co.,	Michael McDonald,	Fall of coal.
27,	15	Koh-i-noor, ...	Shenandoah, .	Richard Heckscher & Co.,	William Boner,	Fall of coal.
28,	16	Plank Ridge, . . .	Shenandoah, .	Philadelphia and Reading Coal and Iron Company,	Daniel Igo,	Fall of coal.
Aug. 10,	17	Ellengowan, . . .	Lannigans, . .	Philadelphia and Reading Coal and Iron Company,	John Downey,	Fall of coal.
14,	18	Lost Creek, No. 2,	Lost Creek, . .	Philadelphia Coal Company,	Daniel Davit,	Fall of coal.
Sept. 6,	19	William Penn, . .	William Penn,	William Penn Coal Company,	Joseph Copelin,	Fall of coal.
6,	20	Turkey Run, . . .	Shenandoah, .	Haas, Brenizer & Co.,	John Thomas,	Igniting a keg of powder.
Oct. 2,	21	Connors, ...	Girardville, . .	Philadelphia and Reading Coal and Iron Company,	Andrew Foy,	Fall of roof.
3,	22	Mahanoy City, . .	Mahanoy City,	Philadelphia and Reading Coal and Iron Company,	John McNamara,	Fall from breaker.
5,	23	Knickerbocker, . .	Yatesville, . . .	Philadelphia and Reading Coal and Iron Company,	Alfred Passant,	Fall of coal.
9,	24	Plank Ridge, . . .	Shenandoah, .	Philadelphia and Reading Coal and Iron Company,	William Murdock,	Fall of coal.
11,	25	William Penn, . .	William Penn,	William Penn Coal Company,	Owen Cunningham,	Fall of coal.
Nov. 16,	26	Suffolk, ...	St. Nicholas, .	St. Nicholas Coal Company,	John Roberts,	Dragged by mine car.
29,	27	North Mahanoy, .	Mahanoy City,	Philadelphia and Reading Coal and Iron Company,	Josiah Holt,	Fall of coal.
Dec. 27,	28	West Shenandoah,	Shenandoah, .	Philadelphia and Reading Coal and Iron Company,	Martin Hennessy,	Fall of coal.
29,	29	North Mahanoy, .	Mahanoy City,	Philadelphia and Reading Coal and Iron Company,	William Hughes,	Fall of roof.

List of NON-FATAL ACCIDENTS in the Second Schuylkill District, for the Year ending December 31, 1877.

Date.	No. of accident.	Name of Colliery.	Location.	Name of Owner or Agent.	Names of Persons Injured.	Cause of Accident.
Jan. 10,	1	Thomas, or Keely Run,	Shenandoah,	Thomas Coal Company,	John O'Keefe,	Struck by mine car.
11,	2	Lawrence,	Mahanoy Plane,	Lawrence & Merkle,	John Hanley,	Burned by gas.
13,	3	St. Nicholas,	St. Nicholas,	St. Nicholas Coal Company,	Mordica Pursell,	Burned by powder.
19,	4	Mahanoy City,	Mahanoy City,	Philadelphia and Reading Coal and Iron Company,	John Maher,	Fall of coal.
21,	5	Stanton,	Mahanoy Plane,	Miller, Hoch & Co.,	John and William Burchell,	Burned by gas.
25,	6	Elmwood,	Mahanoy City,	Philadelphia and Reading Coal and Iron Company,	Jerry O'Neill,	Fall of roof.
Feb. 2,	7	Ellengowan,	Lannigans,	Philadelphia and Reading Coal and Iron Company,	Joseph Thompson,	Breaker machinery.
12,	8	Packer, No. 4,	Lost Creek,	Philadelphia Coal Company,	William Fee,	Mine car.
21,	9	Indian Ridge,	Shenandoah,	Philadelphia and Reading Coal and Iron Company,	John Sunderland,	Monkey rollers.
Mar. 14,	10	William Penn,	William Penn,	William Penn Coal Company,	Thomas Davis,	Burned by gas.
19,	11	Primrose,	Mahanoy City,	C. B. Knevels, trustee,	William Edwards,	Fall of roof.
24,	12	Girard Mammoth,	Raven Run,	Girard Mammoth Coal Company,	John Cresswell,	Fall of coal.
26,	13	Koh-i-noor,	Shenandoah,	Richard Heckscher & Co.,	John Dunn,	Fall of coal.
April 9,	14	Gilberton,	Gilberton,	Gilberton Coal Company,	George Simmonds,	Burned by gas.
9,	15	Gilberton,	Gilberton,	Gilberton Coal Company,	Robert Brittan,	Burned by gas.
6,	16	Draper,	Gilberton,	Gilberton Coal Company,	James Garaway,	Fall of coal.
21,	17	Knickerbocker,	Yatesville,	Philadelphia and Reading Coal and Iron Company,	George Goodhead,	Fall of coal.
23,	18	Girard,	Girardville,	Philadelphia and Reading Coal and Iron Company,	Daniel Loftus,	Fell down slope.
27,	19	West Shenandoah,	Shenandoah,	Philadelphia and Reading Coal and Iron Company,	Thomas Scanthlin,	Fall of coal.
May 2,	20	Elmwood,	Mahanoy City,	Philadelphia and Reading Coal and Iron Company,	Martin Hoolihan,	Kick of a mule.
5,	21	William Penn,	William Penn,	William Penn Coal Company,	William Dougherty,	Fall of coal.
8,	22	Boston Run,	Boston Run,	Philadelphia and Reading Coal and Iron Company,	Michael Burns,	Burned by gas.
11,	23	West Shenandoah,	Shenandoah,	Philadelphia and Reading Coal and Iron Company,	Evan Morgan,	Mine car.
22,	24	Shenandoah City,	Shenandoah,	James Neill, trustee,	Philip Devitt,	Caught between car and coal.
June 5,	25	Mahanoy City,	Mahanoy City,	Philadelphia and Reading Coal and Iron Company,	James Boyer,	Fall of coal.
6,	26	West Shenandoah,	Shenandoah,	Philadelphia and Reading Coal and Iron Company,	Wm. Collins and Jas. Maskall,	Riding down grade on car.
7,	27	Mahanoy City,	Mahanoy,	Philadelphia and Reading Coal and Iron Company,	Patrick Roach,	Fall of coal.
20,	28	Stanton,	Mahanoy Plane,	Miller, Hoch & Co.,	Joseph Renney,	Burned by gas.
29,	29	Girard,	Girardville,	Philadelphia and Reading Coal and Iron Company,	Joseph Moyer,	Burned by powder.
July 3,	30	Turkey Run,	Shenandoah,	Haas, Brenizer & Co.,	Daniel Murphy,	Fall of coal.
Aug. 3,	31	Plank Ridge,	Shenandoah,	Philadelphia and Reading Coal and Iron Company,	James McHugh,	Fall of coal.
3,	32	Gilberton,	Gilberton,	Gilberton Coal Company,	Florence Mahony,	Struck with a piece of coal.
10,	33	Plank Ridge,	Shenandoah,	Philadelphia and Reading Coal and Iron Company,	Henry D. Freign,	Struck by a log at saw-mill.
14,	34	Packer, No. 4,	Lost Creek,	Philadelphia Coal Company,	Frank Barlow,	Fall of coal.
18,	35	Indian Ridge,	Shenandoah,	Philadelphia and Reading Coal and Iron Company,	Wm. Coyle, died of inj'y in Phila	Caught by coal.
20,	36	Elmwood,	Mahanoy City,	Philadelphia and Reading Coal and Iron Company,	Daniel Thomas,	Fall of coal.
21,	37	Connors,	Girardville,	Philadelphia and Reading Coal and Iron Company,	John Conway,	Fall of coal.
21,	38	Lehigh, No. 3,	Shenandoah,	Philadelphia Coal Company,	Owen Cunningham,	Fall of coal.
27,	39	Shenandoah City,	Shenandoah,	James Neill, trustee,	Henry Barnhurst,	Burned by gas.
Sept. 10,	40	Mahanoy City,	Mahanoy City,	Philadelphia and Reading Coal and Iron Company,	James Cunningham,	Fingers cut off in cogs.
11,	41	Suffolk,	St. Nicholas,	Suffolk Coal Company,	William Trevelhan, (died,)	Fall of roof.
11,	42	Turkey Run,	Shenandoah,	Haas, Brenizer & Co.,	Hugh McGuire,	Fall of coal.
11,	43	Turkey Run,	Shenandoah,	Haas, Brenizer & Co.,	Michael Rice, (died,)	Head caught between cars.

No. 1

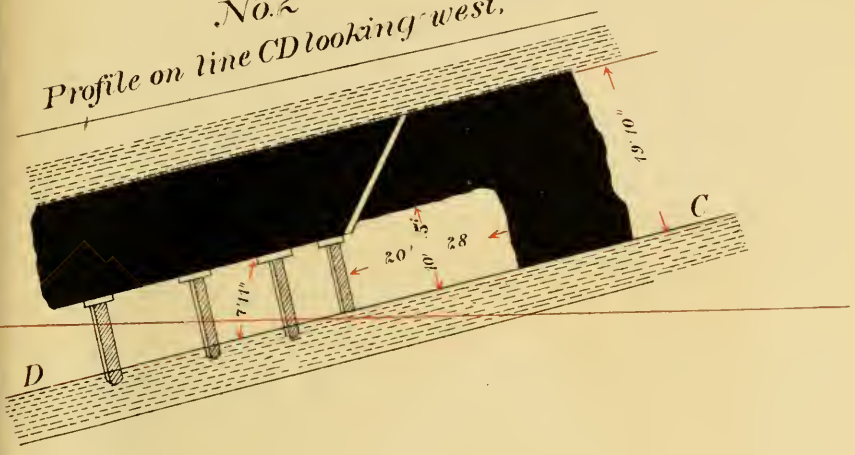


SKETCH SHOWING THE PLAC
AT CONI

See accident. No 21

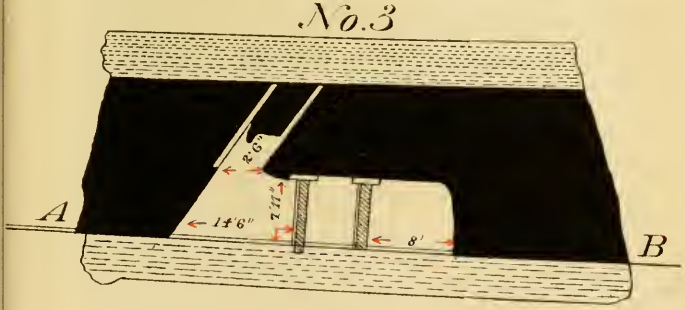
No.2

Profile on line CD looking west.



Cross Section on line AB looking north

No.3



WHERE ANDREW FOY WAS KILLED

ER COLLIERY

Scale 48 ft per inch

19,	44	Honey Brook, No. 4	Audenried,	Lehigh and Wilkesbarre Coal Company,	James Connors,	Fall of coal.
22,	45	Ellengowan,	Lannigans,	Philadelphia and Reading Coal and Iron Company,	Edward Jennings,	Burned by powder.
24,	46	North Mahanoy,	Mahanoy City,	Philadelphia and Reading Coal and Iron Company,	Charles McKenny,	Fall of coal.
24,	47	Tunnel Ridge,	Mahanoy City,	George W. Cole,	Patrick Coleman,	Fall of coal.
Oct. 3,	48	Hammond,	Girardville,	Philadelphia and Reading Coal and Iron Company,	Martin McDonald,	Foot caught under rope.
3,	49	Plank Ridge,	Shenandoah,	Philadelphia and Reading Coal and Iron Company,	Dennis Manning,	Leg broke by mine car.
12,	50	Ellengowan,	Lannigans,	Philadelphia and Reading Coal and Iron Company,	Michael Cuff,	Fall of coal.
12,	51	Suffolk,	St. Nicholas,	St. Nicholas Coal Company,	Edward Fitzgerald,	Burned by powder.
Nov. 23,	52	Glendon,	Mahanoy City,	Haydon & Co.,	Robert Marsh,	Jammed with mine cars.
22,	53	Gilberton,	Gilberton,	Gilberton Coal Company,	George Fowler,	Rush of coal in chute.
23,	54	Gilberton,	Gilberton,	Gilberton Coal Company,	Frederick Weeks,	Caught by machinery.
23,	55	Koh-i-noor,	Shenandoah,	Richard Heeksecher & Co.,	David Davis,	Fall of coal.
Dec. 6,	56	West Shenandoah,	Shenandoah,	Philadelphia and Reading Coal and Iron Company,	George Miller,	Fall of roof.
10,	57	Turkey Run,	Shenandoah,	Haas, Brenizer & Co.,	Patrick Cummings,	Lost leg in monkey rollers.
10,	58	Thomas,	Shenandoah,	Thomas Coal Company,	Peter Berriman,	Foot cut with saw.

List of Fatal Accidents and loss of Life therefrom.

No.	Occupation.	Remarks.
1	Miner, ...	Thomas Sheeken, burned to death by an explosion of blasting powder, which the deceased himself ignited by carelessly handling powder, with his lamp burning on his head.
2	Laborer, . . .	Michael Mulhall, caught in bottom of shaft by the cage.
3	Miner, ...	John Cosgrove, killed by a fall of coal from an unseen slip.
4	Miner, ...	John Mulloy, killed by a fall of coal from an unseen slip.
5	Miner, ...	Martin Clarke, killed by a fall of coal. There was but very little judgment displayed in this case. The deceased had just drilled a hole in the piece of coal, which fell and killed him.
6	Oiling machin'y,	Martin Maley.—This boy lost his life by being caught between the back of a level cog-wheel and a piece of timber, which supported the bearing of the same. The circumstances under which this accident occurred show that there was not that strict discipline enforced which is highly necessary in and around the mines, particularly in coal breakers, where there are from fifty to one hundred boys employed. The deceased was engaged in oiling the machinery. From the evidence taken at the coroner's inquest, it appears that he had been passing back and forth for some time previous to the accident, between this cog-wheel and the screen. On the day of the accident, the boy wore a new pair of shoes, which—he himself stated before he died—were the cause of his foot slipping from the timber, bringing it in contact with the cog-wheel. This, as a matter of course, was not the proper traveling way by which the boy should have gone to perform his duties; but, as I before said, it shows very loose discipline when officers in charge of any department allow either men or boys to do acts whereby there is danger of losing their lives, or getting otherwise injured.
7	Miner, ...	John Carr, killed by a fall of coal in an old chute, which was temporarily abandoned. The deceased had been forbidden by the inside foreman to take any coal out of this place.
9	Miner, ...	Henry Eckley, killed by a fall of coal from an unseen slip.
10	Miner, ...	Benjamin Clemson, killed by a fall of coal. A temporary prop in this case would have prevented the accident.
11	Inside foreman,	Edward Davis, killed by a fall of bony coal, which formed the roof, while assisting some of the workmen to stand timbers on the gangway.
12	Miner, ...	Edward Dowd, killed by a piece of coal flying from a shot. It would appear, from the testimony taken at the investigation, that the deceased must have been very reckless, from the fact that it was only a few minutes before this that he came near injuring or killing his partner with a shot, by not giving him sufficient warning to retreat to a place of safety. There is every reason to believe that Dowd was in the act of looking up the breast at the burning match, from the cross-heading, into which he had gone for a place of safety, when the shot exploded.
13	Miner, ...	Harrison Davis, killed by being struck on the head with a small piece of coal falling a distance of eighteen or twenty feet.
14 and 15	Miners, ...	Michael McDonald, and William Boner, killed by a fall of coal. This is one of those accidents which it would not be out of place to call suicide. The men's attention had been called to the dangerous condition of the coal which formed the roof they were working under, two days before the accident occurred, by fellow workmen; and the day the accident occurred, the boss visited the breast and stopped the cars from them, for the purpose of compelling them to make their place secure. After these men found they could get no more cars to load, they turned their attention to the dangerous piece of coal which they had been cautioned about, and drilled a hole in it for the purpose of blasting

List of Fatal Accidents, and loss of Life therefrom—Continued.

No.	Occupation.	Remarks.
		it down, and whilst in the act of tamping the hole, the coal fell, killing them instantly. The lump of coal weighing about fifteen tons.
16	Miner, ...	Daniel Igo, killed by a fall of coal. This accident is somewhat similar to the above. The deceased's partner testified in this case, that he told Igo to keep from under the coal, or he would be either injured or killed, but he persisted in finishing the loading of a car of coal he was engaged at. He was not permitted to satisfy his desire, for the coal fell, killing him instantly.
17	Miner, ...	John Downey, killed by a piece of coal, whilst in the act of barring it down.
18	Miner, ...	Daniel Devitt, killed by a fall of coal.
19	Miner, ...	Joseph Copelin, killed by a fall of coal, caused by an unseen slip.
20	Miner, ...	John Thomas.—This man was burned to death by the explosion of a keg of powder, ignited by himself. He had been cautioned by the boss, only the day before, of the danger of carelessly handling powder with a lighted lamp on his head.
21	Miner, ...	Andrew Foy, killed by a fall of roof; cause of accident, insufficient propping. The top, or roof, in this place, was of a very treacherous nature, nevertheless, with judicious use of props, the place could have been kept reasonably safe; but instead of having this dangerous place well secured with props, the space between face and last prop stood, was seventeen feet. Had there been only one prop stood in the space mentioned, this accident would have been avoided.
22	Slate Picker, . .	John McNamara, a boy, killed by falling from trestling at breaker; cause of accident, disobeying orders on one hand, and on the other, by the officers not enforcing such orders when given.
23	Miner, ...	Alfred Passant, killed by a fall of coal, caused by an unseen slip.
24	Miner, ...	William Murdock, killed by a fall of coal; cause of accident, carelessness, or gross neglect.
25	Miner, ...	Owen Cunningham, killed by a fall of coal. This accident
8 and 26	Drivers, ...	maybe classed with the one preceding it. Daniel Curtin and John Roberts, lost their lives by falling under, or being dragged by mine car. In one of these cases, the boy was employed as a spragger, to run the cars down a grade dipping about six degrees. The boy stated, before he died, that while in the act of trying to sprag a car, he slipped and fell under, the wheels catching his arm near the shoulder, dragging him about sixty feet before the wheel passed over the arm. In the other case, unfortunately there was no evidence to show how it happened, as the boy was found dead on the gangway. There is no doubt, in my mind, but that he fell under the car, it passing over him, the axle striking him on the back of the head, killing him instantly.
27	Miner, ...	Josiah Holt, killed by a fall of coal. The deceased was alone at the time the accident occurred, therefore, it is a difficult matter to say how it happened, as there were no traces left to show whether the coal fell from the top, or from the face.
28	Miner, ...	Martin Hennessy, killed by a fall of coal. The deceased was a young man, working with his father, who stated, that when the accident occurred, he was down in a cross-heading, about fifteen yards from the face, making a shot of powder for the purpose of blasting down the coal, which fell, causing the death of his son. He also testified that he told the deceased to keep from under the coal, as it was working, and he did not consider it safe.
29	Miner, ...	William Hughes, killed by a fall of roof.

Names of Collieries, by whom operated, names

Name of Colliery.	Name of Operator.	Name of Land Owners.
William Penn,	William Penn Coal Company,	City lands, or Girard estate,
Lehigh, No. 3,	Philadelphia Coal Company,	City lands, or Girard estate,
Packer, No. 4,	Philadelphia Coal Company,	City lands, or Girard estate,
Shenandoah, No. 2,	Philadelphia Coal Company,	City lands, or Girard estate,
Colorado, No. 1,	Philadelphia Coal Company,	City lands, or Girard estate,
Hammond,	P. and R. Coal and Iron Company,	City lands, or Girard estate,
Connor,	P. and R. Coal and Iron Company,	City lands, or Girard estate,
Girard,	P. and R. Coal and Iron Company,	City lands, or Girard estate,
Bear Ridge, No. 1,	Bear Ridge Coal Company,	City lands, or Girard estate,
Bear Ridge, No. 2,	Bear Ridge Coal Company,	City lands, or Girard estate,
Thomas Colliery, No. 1,	Thomas Coal Company,	City lands, or Girard estate,
Thomas Colliery, No. 2,	Thomas Coal Company.	City lands, or Girard estate,
Koh-i-noor,	Richard Heckscher & Co.,	Gilbert, Schaeffer, and others,
Gilberton,	Gilberton Coal Company,	Gilbert, Schaeffer, and others,
Draper,	Smith and Almon, trustees,	Gilbert, Schaeffer, and others,
Stanton,	Miller, Hoch & Co.,	Gilbert, Schaeffer, and others,
Lawrence,	Lawrence, Merkle & Co.,	Gilbert, Schaeffer, and others,
Turkey Run,	Haas, Brenizer & Co.,	Gilbert, Schaeffer, and others,
West Shenandoah,	P. and R. Coal and Iron Company,	Gilbert, Schaeffer, and others,
Furnace,	Atkins Brothers,	Gilbert, Schaeffer, and others,
Cambridge,	Cambridge Coal Company,	Gilbert, Schaeffer, and others,
Koh-i-noor Primrose,		Gilbert, Schaeffer, and others,
Cuyler,	Heaton & Brothers,	Girard heirs,
Girard Mammoth,	Girard Mammoth Coal Company,	
Indian Ridge,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
Plank Ridge,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
Knickerbocker,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
Ellengowan Shaft,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
Ellengowan Drift,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
Boston Run,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
Elemwood,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
Mahanoy City,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
North Mahanoy,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
St. Nicholas,	St. Nicholas Coal Company,	P. and R. Coal and Iron Company,
Bear Run,	Wiggan & Triebles,	P. and R. Coal and Iron Company,
Suffolk,	Suffolk Coal Company,	P. and R. Coal and Iron Company,
Schuylkill,	P. and R. Coal and Iron Company,	Delano Land Company,
Staffordshire,	Ward, Jones & Oliver,	P. and R. Coal and Iron Company,
North Star,	North Star Coal Company,	P. and R. Coal and Iron Company,
Harford,	King, Tyler & Co.,	P. and R. Coal and Iron Company,
Shenandoah City,	James Neil, trustee,	P. and R. Coal and Iron Company,
Honey Brook, No. 1,	E. B. Leisenring,	Lehigh and Wilkes Barre Coal Co.,
Honey Brook, No. 4,	E. B. Leisenring,	Lehigh and Wilkes Barre Coal Co.,
Honey Brook, No. 5,	E. B. Leisenring,	Lehigh and Wilkes Barre Coal Co.,
Tunnel Ridge,	George W. Cole,	P. and R. Coal and Iron Company,
Copley,	Lentz & Bowman,	Delano Land Company,
Glendon,	J. C. Haydon & Co.,	Delano Land Company,
West Lehigh,	Fisher, Hazard & Co.,	Delano Land Company,
Primrose,	Primrose Coal Company,	Delano Land Company,
Vulcan,	Andrew Turnbull & Co.,	Delano Land Company,
Pine Creek,	Edmonds, Thomas & Co.,	Delano Land Company,
Grant,	Parmley & Russell,	Delano Land Company,
Beaver Run,	Kite & Collins,	Delano Land Company,
Myersville,	Idle,	Delano Land Company,
Silver Brook,	Idle,	Delano Land Company,

of Land Owners, and amount of Coal produced.

Kind of Opening.	Amount of coal sent to market.	Amount sold and used at collieries.	Mode of ventilation.	Name of seam.	No. of days worked.	Powder used in kegs of twenty-five pounds weight.	No. of persons employed.
Shaft,	164,476.13	....	Fan, ...	Mammoth,	240	1,200	330
Slope,	117,165.11	....	Fan, ...	Mammoth,	217	3,060	326
Slope,	101,860.01	....	Fan, ...	Mammoth,	202½	2,617	289
Slope,	88,830.01	....	Fan, ...	Mammoth,	227	1,937	305
Slope,	85,955.08	....	Fan, ...	Mammoth,	220	1,983	312
Slope,	121,416.04	....	Fan, ...	Mammoth,	...	....	245
Drift,	102,639.04	....	Fan, ...	Buck Mountain,	...	....	306
Two slopes,	95,043.07	....	Fan, ...	Mammoth,	273¾	....	252
Slope,	23,517.15	....	Fan, ...	Mammoth,	94	663	179
Tunnel,	84,976.00	....	Fan, ...	Mammoth,	214	800	219
Slope,	68,905.13	....	Fan, ...	Mammoth and Buck Mountain,	186	975	250
Slope,	Idle all this year.						
Shaft,	162,027.02	....	Fan, ...	Mammoth,	268	3,100	325
Two slopes,	87,832.00	....	Fan, ...	Mammoth,	266	1,075	217
Two slopes,	108,344.00	....	Fan, ...	Mammoth,	250½	1,813	238
Two slopes,	78,289.00	....	Fan, ...	Mammoth,	235	1,137	251
Tunnel and 2 slopes,	99,547.00	....	Fan, ...	Mammoth,	...	....	253
Tunnel and slope,	60,529.00	....	Fan, ...	Mammoth,	205¾	1,857	250
Slope,	100,762.00	....	Fan, ...	Buck Mountain,	...	....	269
Drift,	4,458.00	....	Fan, ...	Buck Mountain,	...	....	80
Drift,	2,863.00	....	Natural, ..	Primrose,	...	....	15
Drift,	.....	....	Natural, ..	Primrose.			
Drift and slope,	55,970.00	....	Fan, ...	Buck Mountain,	...	....	245
Tunnel and slope,	34,608.00	....	Fan, ...	Buck Mountain,	...	....	227
Shaft,	155,131.00	....	Fan, ...	Mammoth,	256	....	328
Shaft,	118,819.00	....	Fan, ...	Mammoth and Buck Mountain,	230	2,441	293
Slope,	133,923.00	....	Two fans, .	Primrose,	...	....	199
Shaft,	.....	....	Fan, ...	Primrose and Mammoth,	...	....	83
Drift,	145,866.00	....	Fan, ...	Mammoth,	...	...	270
Slope,	68,598.00	....	Two fans,	Mammoth,	...	....	148
Slope,	65,260.00	....	Fan, ...	Buck Mountain and Skidmore,	...	...	193
Slope,	117,293.00	....	Two fans, .	Primrose and Mammoth,	...	....	346
Slope,	86,886.00	....	Two fans, .	Skidmore and Buck Mountain,	...	....	283
Slope,	92,434.00	....	Fan, ...	Skidmore and Mammoth,	241½	2,105	200
Slope,	82,409.00	....	Fan, ...	Primrose and Mammoth,	...	....	180
Slope,	66,181.00	....	Fan, ...	Primrose and Orchard,	202¾	1,500	198
Shaft,	21,058.00	....	Fan, ...	Buck Mountain,	...	...	182
Tunnel,	8,265.00	....	Furnace, .	Diamond,	142½	260	23
Tunnel,	1,504.00	....	Fan, ...	Skidmore,	...	....	25
Tunnel,	553.00	....	Natural, ..	Buck Mountain,	...	....	15
Slope and drift,	47,903.00	....	Fan, ...	Mammoth and Buck Mountain,	136½	675	236
Slope,	102,781.00	....	Furnaces, .	Mammoth,	216	2,245	292
Slope,	101,281.00	....	Furnaces,	Mammoth,	219	1,289	225
Slope,	132,869.00	....	Furnaces, .	Mammoth,	231	1,577	296
Slope,	30,340.00	....	Fan, ...	Mammoth,	...	....	250
Shaft,	28,211.08	....	Natural, ..	Buck Mountain,	...	....	209
Slopes,	41,212.04	....	Fan, ...	Buck Mountain and Skidmore,	115	....	190
Slopes,	23,405.10	....	Fan, ...	Buck Mountain and Skidmore,	...	....	200
Slopes,	50,573.03	....	Fan, ...	Primrose and Skidmore,	167	1,453	277
Slopes,	6,356.19	....	Fan.	Primrose,	...	....	100
Slopes,	1,622.11	....	Steam pump	Buck Mountain,	...	....	60
Drift,	3,583.15	....	Furnace, .	Buck Mountain and Skidmore,	...	....	20
Drift,	1,347.06	....	Furnace, .	Skidmore,	...	....	20
Slope,	.....	....	.....	Buck Mountain.			
Slope,	.....	....	.....	Mammoth.			
		215,403					

TABLE No. 1.

SUMMARY OF ACCIDENTS.	Fatal.	Non-fatal.
Explosion of fire-damp,		7
Falls of coal,	18	21
Falls of roof,	2	6
Explosions of blasting powder,	3	5
Crushed by mine cars,	2	7
Caught by machinery,	1	5
Falling down shafts,		
Falling down slopes,		1
Miscellaneous, under ground,	2	4
Miscellaneous, above ground,	1	2
Total,	29	58

Four of the persons quoted in the above column of non-fatal accidents died of their injuries some time after the occurrence.

TABLE No. 2.—Showing Amount of Coal Produced per Life Lost.

Total quantity of coal produced in tons,	3,805,467
Number of tons produced per life lost,	115,317
Number of fatal accidents,	28
Number of lives lost by such accidents,	29
Number of persons employed,	10,537
One fatal accident to every 363 persons employed.	
Number of tons of coal produced per each person employed,	361

Summary of Total Accidents in this District, and Amount of Coal Produced from 1870 to December 31, 1877.

Date.	Number of tons produced.	Number of lives lost.	No. of tons produced per life lost.	Number of persons employed.
1870, . .	1,840,914	38	48,445	
1871, . .	2,444,267	41	59,616	
1872, . .	3,045,315	36	85,716	
1873, . .	3,142,671	47	66,814	
1874, . .	2,676,724	29	92,284	
1875, . .	2,562,345	26	98,551	10,403
1876, . .	2,891,117	27	107,078	12,218
1877, . .	3,805,467	29	131,223	10,537

Improvements.

Ellengowan Shaft.

This colliery is undergoing complete renovation. A new pair of hoisting engines has been erected, of steam cylinders, with a diameter of twenty inches, and a four (4) feet stroke, first motion, with cone-drums. The foundations are built of cut stone, and put up in the most substantial manner. The buildings are of brick, with sheet-iron roofs. Also, a large Bull pumping-engine has been erected, with a steam cylinder of fifty (50) inch diameter, of ten feet stroke, with twenty (20) inch pole or plunger pump

for drainage. A new breaker is also under way, and will be completed early in 1878.

This colliery, when in operation, is estimated to have a capacity of yielding two hundred and fifty cars per day, or twelve hundred and fifty tons, and undoubtedly in future will be one of the largest producing collieries in the anthracite coal region, as it will be only a question of handling and preparing of the coal outside. The shaft is three hundred and thirty three feet deep, which gives about six hundred feet run on the dip of seam, (Mammoth,) which, at this mine, is split into three separate seams, running from ten to fourteen feet each in thickness. A tunnel has been driven south, opening the Primrose vein in splendid condition, ranging from ten to twelve feet thick, with a run on dip of seam one thousand and sixty feet, which will be divided into six sections, (or lifts.) From the above named seams which are already opened gives this colliery eighteen gangways, whilst the Skidmore (seven foot) and Buck Mountain seams are untouched. There are also four more overlaying seams, but basins before they reach the present shaft level.

Kohlnoor Colliery.

A new slope is being opened on the west side of the shaft, and which will be continued down to the bottom of the basin; this will make the second inside slope operated in this colliery; the present slope has been in operation for some time, and is located on the east side of shaft, and is down nearly fifteen hundred feet, on an angle varying from six degrees to ten degrees below the shaft level. It has been discovered by the workings running east from slope that the basin dips to the west. Therefore, with the second new slope, it is intended to reach the deepest part of the cynclinal axis.

Two pairs of the Burligh air compressors supply the motive power for the present inside machinery. The new slope machinery will also be driven by compressed air supplied by two pairs of the largest size Allison & Bannan air compressors. Safety appliances have been attached to the water tanks, on which the men are lowered and hoisted in and out of the mine. The Howard pneumatic gong has been applied to the speaking tube.

This colliery is in first-class condition, money has not been spared through all its various branches and departments to help to bring it to the highest standard.

Knickerbocker Colliery.

A tunnel has been driven north from "Primrose" seam, cutting top split of the "Mammoth," and is being continued to the bottom split.

Plank Ridge Colliery.

A tunnel has been driven from "Mammoth" seam, cutting Skidmore seven feet and Buck Mountain. I understand that the coal remaining in "Mammoth" seam in future will be taken out at the Indian Ridge shaft,

which is located in the same basin, and the Plank Ridge colliery will be converted into a Buck Mountain and Skidmore colliery.

West Shenandoah Colliery.

A new lift has been sunk on Buck Mountain seam.

Operated by the Philadelphia Coal Company.

Packer Colliery.

This is a new colliery, the first coal passed over the new breaker March 1, 1877. Its shipments in November were nineteen thousand three hundred and thirty-four tons. Up to this time one track only in slope had been used, and then hoisting only one car at a time.

In future, this colliery will be one of the largest producers in this district. There are four collieries operated by this company, three of which may be classed as A 1, and capable of producing four hundred and fifty thousand tons of coal in 1878, if run to their full capacity.

The condition of the mines both inside and outside are good, and I am pleased to say are the best ventilated mines in my district, and is doubtful to me if there are better in the county. The telephone has been placed in the slope of *this* colliery, and which I believe is the first permanently used in the coal mines of this country, and gives very satisfactory results. Length of wire one thousand feet.

THIRD OR SHAMOKIN DISTRICT.

To his Excellency John F. Hartranft, *Governor of the Commonwealth of Pennsylvania:*

Sir: I herewith submit my *fifth*, and last annual report, as inspector of coal mines for the Third or Shamokin district, for the year ending December 31, 1877. My commission bearing date of April 23, 1873, for five years, said term of office will expire on the 28th day of April, 1878.

This report gives the number of fatal and non-fatal accidents during the year, number of tons of coal mined and sent to market, with estimated amount of coal consumed at collieries and by employés, &c.

Lists, in tabular form, are also given of the working collieries in this district; also, the names of lessees, land owners, location of colleries, and name of veins being worked, with number of openings described, *i. e.* slopes, shafts, tunnels, drifts, and machinery in use at the same, and number of men employed, &c.

I am pleased to be able to report a decrease of nine fatal accidents this year, but a slight increase of non-fatal accidents; quite a number of them however not of a serious nature.

The total amount of coal mined and sent to market, as per statements given, is 3,229,357 tons, besides estimated amount consumed by machinery and employés at 242,205 tons, giving a total of 3,471,562 tons, an increase of 272,256 tons compared with tonnage of 1876.

The number of fatal accidents in 1876 were thirty-seven, and 1877, twenty-eight, showing a decrease of nine, nearly twenty-five per cent.

In 1876, 81,711 tons of coal were mined to each life lost, while in 1877, 123,842 tons were mined.

Fifty-four colleries are in operation in this district. Forty-six steam fans are in use for ventilation purposes; the ventilation is slowly, but surely improving. Considerable opposition has been met with in trying to establish good and proper ventilation, but that feeling is gradually giving way to reason, as it is a too well known fact that a well ventilated mine is generally the most profitable.

Very respectfully submitted.

WILLIAM HEMINGRAY.

Number and general description of

Number.	Name of Colliery.	Name of Operator.	Name of Land Owner.
1	Mt. Carmel or Alaska Shaft	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
2	Bast,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
3	West Brookside,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
4	Bear Valley,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
5	Burnside,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
6	George Fales,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
7	Helfenstein,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
8	Keystone,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
9	Locust Run,	P. and R. Coal and Iron Company,	Locust Mountain Coal and Iron Co.
10	Merriam,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
11	Locust Spring,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
12	Potts,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
13	North Ashland,	P. and R. Coal and Iron Company,	Girard estate,
14	Preston, No. 1,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
15	Preston, No. 2,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
16	Preston, No. 3,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
17	Preston, No. 4,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
18	Tunnel,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
19	Wadley Slope,	P. and R. Coal and Iron Company,	P. and R. Coal and Iron Company,
20	N. Franklin or Trevorton,	P. and R. Coal and Iron Company,	P. & R. C. & I. Co., & Lehigh Valley,
21	Big Mountain,	Patterson, Llewellyn & Co.,	P. and R. Coal and Iron Company,
22	Excelsior,	C. W. Kingsley & Co.,	P. and R. Coal and Iron Company,
23	Enterprise,	Thomas Baumgardner,	P. and R. Coal and Iron Company,
24	Reliance,	Thomas Baumgardner,	P. and R. Coal and Iron Company,
25	Locust Gap,	Graber & Co.,	P. and R. Coal and Iron Company,
26	Franklin,	Lovel & Booth,	P. and R. Coal and Iron Company,
27	Henry Clay, No. 1,	Langdon & Co.,	P. and R. Coal and Iron Company,
28	Henry Clay,	Langdon & Co.,	P. and R. Coal and Iron Company,
29	Peerless,	John Cruikshank,	P. and R. Coal and Iron Company,
30	Sterling,	Kendrick & Fulton,	P. and R. Coal and Iron Company,
31	Royal Oak,	Tillet & Son,	P. and R. Coal and Iron Company,
32	Ben Franklin,	Baumgardner & Co.,	P. and R. Coal and Iron Company,
33	Monitor,	G. W. Johns & Bro.,	P. and R. Coal and Iron Company,
34	Cameron,	Mineral Railroad and Mining Co.,	Mineral Railroad and Mining Co.,
35	Luke Fidler,	Mineral Railroad and Mining Co.,	Mineral Railroad and Mining Co.,
36	Hickory Ridge,	Mineral Railroad and Mining Co.,	Mineral Railroad and Mining Co.,
37	Short Mountain,	Summit Branch Coal Company,	Short Mountain Coal Company,
38	Big Lick,	Lykens Valley Coal Company,	Summit Branch Coal Company,
39	Morton,	D. J. Lewis,	Northern Central Railroad,
40	Williamstown,	Summit Branch Coal Company,	Summit Branch Coal Company,
41	Lancaster,	Smith & Keiser,	Mineral Railroad and Mining Co.,
42	Black Diamond,	Swank & Co.,	Henry Saylor,
43	Centralia,	Doctor Prevost,	Locust Mountain Coal and Iron Co.
44	Hazel Dell,	Gorrel & Co.,	Locust Mountain Coal and Iron Co.
45	Stewartville,	Montilius & Co.,	Locust Mountain Coal and Iron Co.
46	Big Mine Run,	J. Taylor & Co.,	Locust Mountain Coal and Iron Co.
47	Continental,	Audenreid & Co.,	Girard estate,
48	Lilly,	George Troutman,	Locust Mountain Coal and Iron Co.
49	Buck Ridge,	I. May & Co.,	Renshaw & Johnson,
50	Big Run Gap,	James Fermis,	Short Mountain Coal Company,
51	North Side,	Ed. Miller,	Short Mountain Coal Company,
52	West Lehigh,	F. L. Shuman,	Long, Lee & Hunter,
53	Glen City,	J. H. Losee,	Longenberger & Co.,
54	Marshall,	George Roup,	Marshall estate,

Collieries in Shamokin District, in 1877.

Location.	Name of Vein.	Horse-power in use.	Number of pumps.	Number of fans.	Number of boilers.	Number employed inside.	Number employed outside.	Total number employed.	Tonnage.	Number of colliery.
Alaska,	E, or Mammoth,	385	1	1	16	305	155	460	148,305.10	1
Big Mine Run,	E, or Mammoth,	1,280	3	1	26	171	145	316	118,911.09	2
Tower City,	Lykens Valley,	295	3	2	22	573	177	750	369,573.07	3
Carbon Run,	Twins,	150	1	1	9	154	156	310	55,632.07	4
Burnside,	Twins,	240	2	2	11	57	25	82	60,637.15	5
Burnside,	Primrose and Red Ash,	90	1	. .	6	34	42	76	4,000.00	6
Helfenstein,	Lykens Valley,	165	1	1	5	49	41	90	37,366.09	7
Locustdale,	E, or Mammoth,	1,010	2	1	19	119	120	239	80,000.00	8
Ashland,	Mammoth and Skidmore,	220	2	1	22	88	107	195	80,940.00	9
Locust Summit,	E, or Mammoth,	375	4	1	20	207	144	351	136,073.10	10
Locust Gap,	E, or Mammoth,	165	2	1	11	120	95	215	72,623.10	11
Locustdale,	E, or Mammoth,	850	4	1	28	154	150	304	103,806.15	12
Dark Corner,	E, or Mammoth,	270	2	1	17	88	148	236	11,460.13	13
Girardville,	E—Skidmore,	105	2	1	7	91	107	198	37,718.02	14
Girardville,	Buck Mountain,	175	2	2	13	95	132	227	76,374.12	15
Girardville,	Mammoth,	815	1	1	17	86	64	150	22,019.11	16
Girardville,	Mammoth,	. . .	. .	. .	. .	. . .	. . .	. . .	. . . . .	17
Ashland,	E and Primrose,	1,470	2	3	36	175	127	302	100,735.03	18
Ashland,	E,	65	2	. .	4	. . .	. . .	. . .	. . . . .	19
Trevorton,	Twins and Lykens Valley,	365	1	2	19	195	132	327	73,134.04	20
Shamokin,	Twins,	90	. .	1	6	310	127	437	130,251.14	21
Excelsior,	Twins,	65	. . .	.	6	120	92	212	45,295.05	22
Excelsior,	Twins,	240	4	1	13	148	63	211	72,743.18	23
Mount Carmel,	Twins,	305	1	1	11	114	121	235	16,359.19	24
Locust Gap,	Twins,	265	1	1	12	135	107	242	76,000.00	25
Shamokin,	Red Ash,	8	. . .	.	1	11	11	21	3,844.06	26
Shamokin,	Twins,	370	1	1	8	50	43	93	8,531.13	27
Shamokin,	Twins,	175	1	1	7	104	64	168	72,637.11	28
Shamokin,	Red Ash,	35	. . .	.	2	47	35	82	12,087.07	29
Shamokin,	Twins,	205	1	1	6	143	77	220	103,044.01	30
Shamokin,	Red Ash,	. . .	. .	. .	. .	1	1	2	304.02	31
Doutyville,	Lykens Valley,	63	2	1	6	85	69	154	21,334.00	32
Locust Summit,	Mammoth,	325	2	1	18	190	75	265	131,110.13	33
Shamokin,	Twins and Lykens Valley,	800	8	2	23	296	189	485	166,047.00	34
Shamokin,	Twins,	280	2	1	10	198	110	308	119,576.15	35
Hickory Ridge,	Twins and Skidmore,	200	1	1	9	131	79	210	23,241.04	36
Wiconisco,	Lykens Valley,	2,989	10	2	53	139	91	230	. . . . .	37
Dayton,	Lykens Valley,	482	2	1	26	194	121	315	52,001.12	38
Mount Carmel,	E, or Mammoth,	12	. . .	.	1	15	14	29	1,250.05	39
Williamstown,	Lykens Valley,	837	5	2	38	434	201	635	263,674.02	40
Coal Run,	Twins,	15	. . .	.	1	35	19	54	6,964.08	41
Green Ridge,	Twins,	185	1	1	6	31	24	55	23,713.09	42
Centralia,	E, or Mammoth,	500	4	1	26	137	93	230	62,976.00	43
Centralia,	E, or Mammoth,	155	. . .	.	12	120	79	199	45,120.00	44
Mount Carmel,	E, or Mammoth,	65	1	. .	6	127	116	243	74,000.17	45
Big Mine Run,	Buck Mountain,	105	. .	1	11	100	123	223	19,000.00	46
Dark Corner,	Mammoth,	270	2	1	17	140	123	263	25,228.13	47
Centralia,	. . . . .	. . .	. .	. .	. .	. . .	. . .	14	. . . . .	48
Shamokin,	Twins,	195	1	1	14	78	23	101	43,560.12	49
Williams Valley,	Lykens Valley,	. . .	. .	. .	. .	. . .	. . .	15	2,008.05	50
Lykens Valley,	Lykens Valley,	10	. .	. .	1	. . .	. . .	12	2,080.12	51
Glen City,	Buck Mountain,	85	1	. .	3	. . .	. . .	. . .	. . . . .	52
Glen City,	Buck Mountain,	90	1	. .	5	56	46	102	14,784.14	53
Red Ash,	. . . . .	8	. .	. .	1	2	2	4	971.16	54

List of ACCIDENTS, and Loss of Life therefrom, in Third or Shamokin district, in 1877.

DATE.	No. of accident.	Name of Colliery.	Location.	Name of Operators.	Name of Persons Killed.
Feb. 5,	1	Centralia,	Centralia,	Doctor Provost,	Thomas Flynn.
April 27,	2	Ben Franklin,	Doutyville,	Baumgardner & Co.,	Leonard Waldroff.
May 2,	3	Merriam,	Locust Summit,	Philadelphia and Reading Coal and Iron Company,	Andro Geaghan.
18,	4	West Brookside,	Tower City,	Philadelphia and Reading Coal and Iron Company,	Bennel Wise.
25,	5	Cameron,	Shamokin,	Mineral Railroad and Mining Company,	Pat Devlin.
June 5,	6	Preston, No. 2,	Girardville,	Philadelphia and Reading Coal and Iron Company,	Andrew Cosgrove.
7,	7	Tunnel,	Ashland,	Philadelphia and Reading Coal and Iron Company,	John Collier.
21,	8	Short Mountain,	Wiconisco,	Short Mountain Coal Company,	John Chappel.
21,	9	Locust Spring,	Locust Gap,	Philadelphia and Reading Coal and Iron Company,	William Wood.
July 19,	10	Luke Fidler,	Shamokin,	Mineral Railroad and Mining Company,	Peter Cole.
Aug. 2,	11	Williamstown,	Williamstown,	Summit Branch Coal Company,	James Ryan.
21,	12	Monitor,	Locust Gap,	G. W. Johns & Bro.,	Casper Walter.
Sept. 10	13	Big Mine Run,	Big Mine Run,	J. Taylor & Co.,	P. McGinley.
21,	14	Bear Valley,	Carbon Run,	Heim & Goodwein—P. and R. Coal and Iron Company,	Isaiah Rhodes.
28,	15	Henry Clay,	Shamokin,	Langdon & Co.,	Lathrie Symons.
Oct. 11,	16	Cameron,	Shamokin,	Mineral Railroad and Mining Company,	John Young.
30,	17	Preston, No. 2,	Girardville,	Philadelphia and Reading Coal and Iron Company,	Pat McNaneman.
23,	18	Locust Gap,	Locust Gap,	Graber & Co.,	Adam Zeigler.
23,	19	Henry Clay,	Shamokin,	Langdon & Co.,	John Larkin.
Nov. 8,	20	West Brookside,	Tower City,	Philadelphia and Reading Coal and Iron Company,	Edward Updegraf.
25,	21	Monitor,	Locust Gap,	G. W. Johns & Bro.,	Charles Mulholla.
Dec. 3,	22	Merriam,	Locust Summit,	Philadelphia and Reading Coal and Iron Company,	Nicholas Rigeway.
7,	23	North Ashland,	Dark Corner,	Philadelphia and Reading Coal and Iron Company,	James McAllister.
12,	24	Merriam,	Locust Summit,	Philadelphia and Reading Coal and Iron Company,	George Neithamer.
17,	25	Cameron,	Shamokin,	Mineral Railroad and Mining Company,	Thomas J. Williams.
21,	26	North Ashland,	Dark Corner,	Philadelphia and Reading Coal and Iron Company,	Thomas Connor.
21,	27	West Brookside,	Tower City,	Philadelphia and Reading Coal and Iron Company,	Charles Shafer.
30,	28	West Brookside,	Tower City,	Philadelphia and Reading Coal and Iron Company,	Jonathan Leffler.

List of NON-FATAL ACCIDENTS in the Third, or Shamokin district, for the Year ending December 31, 1877.

Date.	No.	Name of Colliery.	Location.	Name of Owner or Agent.	Name of Person Injured.	Remarks.
Jan. 17,	1	Sterling,	Burnside,	Kendrick & Fulton,	P. Williams,	Arm fractured while spragging wagon.
17,	2	Luke Fidler,	Shamokin,	Mineral Railroad and Mining Co.,	Daniel Beddo,	Leg broken by fall of coal.
25,	3	Lykens Valley,	Wiconisco,	Summit Branch Coal Company,	William G. Davis,	Arm broken by fall of rock.
26,	4	Cameron,	Shamokin,	Mineral Railroad and Mining Co.,	James Biskill,	Explosion of powder while charging hole.
26,	5	Cameron,	Shamokin,	Mineral Railroad and Mining Co.,	Elias Wall,	Explosion of powder while charging hole.
Feb. 4,	6	Henry Clay,	Shamokin,	Langdon & Co.,	Robert Rodky,	Ribs and hip fractured by fall of coal.
14,	7	Potts Colliery,	Locustdale,	Phila. and Reading Coal and Iron Co.	Con. M. Guire,	Leg broken by prop falling on him.
19,	8	Sterling,	Burnside,	Kendrick & Fulton,	Mike Donnelly,	Burned by explosion of fire-damp.
Mar. 3,	9	Henry Clay,	Shamokin,	Langdon & Co.,	John Hassin,	Run over by mine car on grade; since dead.
3,	10	Henry Clay,	Shamokin,	Langdon & Co.,	Val. Temple,	Run over by mine car on grade.
5,	11	Luke Fidler,	Shamokin,	Mineral Railroad and Mining Co.,	Pat McGlum,	Thigh broken by fall of top coal.
6,	12	Monitor,	Locust Gap,	G. W. Johns & Bros.,	Enoch Kiska,	Collar bone broken by fall of coal.
13,	13	Locust Spring,	Locust Gap,	Phila. and Reading Coal and Iron Co.	Matthew Callen,	Leg broken by piece of slate sliding down chute.
April 2,	14	Luke Fidler,	Shamokin,	Mineral Railroad and Mining Co.,	Pat Toole,	Burned by an explosion of fire-damp.
2,	15	Luke Fidler,	Shamokin,	Mineral Railroad and Mining Co.,	John Manley,	Burned by an explosion of fire-damp.
11,	16	Locust Spring,	Locust Gap,	Phila. and Reading Coal and Iron Co.	Stephen Heffner,	Injured by fall of coal.
13,	17	Alaska Shaft,	Alaska,	Phila. and Reading Coal and Iron Co.	John De Jinski,	Leg broken by fall of coal.
12,	18	Locust Gap,	Locust Gap,	Phila. and Reading Coal and Iron Co.	Thomas McHale,	Injured by fall of coal.
18,	19	Cameron,	Shamokin,	Mineral Railroad and Mining Co.,	William Hartzog,	Back broken by fall of coal; since dead.
19,	20	Locust Spring,	Locust Gap,	Phila. and Reading Coal and Iron Co.	James Hinchan,	Crushed by mine cars.
24,	21	Merriam,	Locust Summit,	Phila. and Reading Coal and Iron Co.	Charles Roseman,	Leg broken by fall of coal.
24,	22	Merriam,	Locust Summit,	Phila. and Reading Coal and Iron Co.	Andrew Schready,	Injured by falling in coal chute.
May 1,	23	Locust Run,	Ashland,	Phila. and Reading Coal and Iron Co.	Henry Pope,	Leg broken by fall of coal.
3,	24	Locust Gap,	Locust Gap,	Graber & Co.,	Michael Moran,	Leg broken by fall of coal.
19,	25	Burnside,	Burnside,	May, Morgan & Co.,	Matthew Grofst,	Leg broken by fall of coal.
24,	26	Cameron,	Shamokin,	Mineral Railroad and Mining Co.,	Jean B. Chartier,	Leg broken by fall of coal.
24,	27	Peerless,	Shamokin,	John Cruikshanks,	James Williams,	Leg broken by fall of roof.
26,	28	Henry Clay,	Shamokin,	Langdon & Co.,	John Mittersiski,	Burned by premature explosion of powder.
26,	29	Merriam,	Locust Summit,	Phila. and Reading Coal and Iron Co.	Frank Miller,	Arm broke falling from dirt bank.
26,	30	Locust Run,	Ashland,	Phila. and Reading Coal and Iron Co.	George Conner,	Crushed between mine cars and gangway timber.
June 1,	31	Williamstown,	Williamstown,	Summit Branch Coal Company,	Robert Perkins,	Injured by being run over by mine cars.
8,	32	Alaska Shaft,	Alaska,	Phila. and Reading Coal and Iron Co.	Charles Muchinski,	Leg broken by fall of coal.
8,	33	Alaska Shaft,	Alaska,	Phila. and Reading Coal and Iron Co.	Joseph Kean,	Leg broken by fall of coal.
19,	34	Helfenstein,	Helfenstein,	Phila. and Reading Coal and Iron Co.	Peter Tehoe,	Injured by fall of coal.
22,	35	Trevorton,	Trevorton,	Phila. and Reading Coal and Iron Co.	J. P. McGinnis,	Injured by being run over by mine cars.
26,	36	Bast,	Big Mine Run,	Phila. and Reading Coal and Iron Co.	Fred. Sevant,	Injured by being run over by mine cars.
11,	37	Merriam,	Locust Summit,	Phila. and Reading Coal and Iron Co.	Peter Steif,	Leg broken by fall of coal.
11,	38	Williamstown,	Williamstown,	Summit Branch Coal Company,	Daniel Bowman,	Leg broken by fall of coal.
July 25,	39	Bast Colliery,	Big Mine Run,	Phila. and Reading Coal and Iron Co.	John Dolphin,	Kicked by a mule.
25,	40	Alaska Shaft,	Alaska,	Phila. and Reading Coal and Iron Co.	Michael Volusky,	Leg broken by fall of coal.
Aug. 3,	41	Stewartville,	Mt. Carmel,	William Montelius & Co.,	Michael Nolan,	Leg broken by fall of coal.
7,	42	Stewartville,	Mt. Carmel,	William Montelius & Co.,	Ernest Sible,	Leg broken by fall of coal; since dead.
8,	43	Merriam,	Locust Summit,	Phila. and Reading Coal and Iron Co.	Peter Skiff,	Leg broken by fall of coal.
28,	44	Brookside,	Tower City,	Phila. and Reading Coal and Iron Co.	John Welsh,	Leg broken by fall of slate.

Non-Fatal Accidents—Continued.

DATE.	No.	Name of Colliery.	Location.	Name of Owner or Agent.	Name of Person Injured.	Remarks.
Aug. 28,	45	Potts, ...	Locustdale, . .	Phila. and Reading Coal and Iron Co.	John Paul, ...	Lost two fingers by fall of rock.
Sept. 26,	46	Tunnel, ...	Ashland, ...	Phila. and Reading Coal and Iron Co.	William John, . . .	Burned by explosion of fire-damp.
26,	47	Tunnel, ...	Ashland, ...	Phila. and Reading Coal and Iron Co.	Thomas Canfield, . .	Burned by explosion of fire-damp.
26,	48	Tunnel, ...	Ashland, ...	Phila. and Reading Coal and Iron Co.	Anthony Brown, . .	Burned by explosion of fire-damp.
Oct. 1,	49	Sterling, ...	Burnside, . . .	Kendrick & Fulton, ...	Peter Ludwig, . . .	Burned by explosion of powder.
2,	50	Henry Clay, No. 1,	Shamokin, . . .	Langdon & Co., ...	Thomas Roach, . . .	Lost leg in breaker machinery.
16,	51	Big Mountain, . .	Shamokin, . . .	Llewellyn, Patterson & Co., ...	Anthony Young, . .	Severely injured by premature explosion of shot.
13,	52	Bast Colliery, . . .	Big Mine Run,	Phila. and Reading Coal and Iron Co.	Bernard Fulton, . .	Burned by explosion of fire-damp.
22,	53	Alaska Shaft, . . .	Alaska, ...	Phila. and Reading Coal and Iron Co.	Thomas McElwee, .	Foot crushed by mine cars.
27,	54	Potts Colliery, . .	Locustdale, . .	Phila. and Reading Coal and Iron Co.	Tobias Kockler, . . .	Foot crushed by mine cars.
Nov. 3,	55	Brookside, ...	Tower City, . .	Phila. and Reading Coal and Iron Co.	James Bowen, ...	Foot broken, run over by mine cars.
7,	56	Helfenstein, ...	Helfenstein, . .	Phila. and Reading Coal and Iron Co.	Elias Krawgh, . . .	Arm broken, crushed by mine cars.
10,	57	Potts, ...	Locustdale, . .	Phila. and Reading Coal and Iron Co.	Michael Symons, . .	Injured by breaker machinery.
10,	58	Brookside, ...	Tower City, . .	Phila. and Reading Coal and Iron Co.	Samuel Benslnger, .	Injured by fall of rock.
28,	59	Big Mountain, . .	Shamokin, . . .	Llewellyn, Patterson & Co., ...	William Smith, . . .	Injured by premature discharge of shot.
Dec. 1,	60	Merriam, ...	Locust Summit,	Phila. and Reading Coal and Iron Co.	William Wakes, . .	Arm broken by fall of coal.
1,	61	Merriam, ...	Locust Summit,	Phila. and Reading Coal and Iron Co.	Martin Weber, . . .	Ribs broken while starting chute.
5	62	Big Run Gap, . . .	Big Run Gap, .	James Fennell, ...	Jonas Hoffman, . . .	Injured by fall of coal.
13,	63	Preston, No. 1, . .	Girardville, . .	Phila. and Reading Coal and Iron Co.	George Osborn, . . .	Ribs broken, crushed by mine cars.
18,	64	Tunnel, ...	Ashland, . . .	Phila. and Reading Coal and Iron Co.	John Curry, ...	Injured by fall of coal.
22,	65	Sterling, ...	Burnside, . . .	Kendrick & Fulton, ...	George Hiney, . . .	Injured by falling of trestling.
22,	66	Locust Run, ...	Ashland, ...	Phila. and Reading Coal and Iron Co.	Anthony Mahan, . .	Injured by fall of coal.
22,	67	Locust Run, ...	Ashland, ...	Phila. and Reading Coal and Iron Co.	Michael Monahen, .	Injured by fall of coal.
22,	68	Williamstown, . .	Williamstown,	Summit Branch Coal Company, . . .	Aaron Griner, . . .	Injured while riding up plane.

Characteristics of Collieries in Shamokin District, in 1877.

Number.	Name of Colliery.	Operator.	Land Owner.	Number of drifts.	Number of tunnels.	Number of inside slopes.	Number of slopes.	Number of shafts.	Number of breakers.
1	Alaska Shaft,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,					2	1
2	Bast,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,	1	1		2		1
3	Brookside,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,		1	1	1		2
4	Bear Valley,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,	1				1	1
5	Burnside,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,	1			3		1
6	George Fales,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,		1		1		1
7	Heffenstein,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,		1	1			1
8	Keystone,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,				2		1
9	Locust Run,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,		1		1		1
10	Merriam,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,		1		2		1
11	Locust Spring,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,				1		1
12	Potts,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,				2		1
13	North Ashland,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,	1			1		1
14	Preston, No. 1,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,	1			1		1
15	Preston, No. 2,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,		2		1		1
16	Preston, No. 3,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,		1		1		
17	Preston, No. 4,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,		1				1
18	Tunnel,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,		2		2		1
19	Wadley Slope,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,				1		
20	Trevorton,	Philadelphia and Reading Coal and Iron Company,	Philadelphia and Reading Coal and Iron Company,	3	1		1		2
21	Big Mountain,	Patterson, Llewellyn & Co.,	Philadelphia and Reading Coal and Iron Company,	6					1
22	Excelsior,	C. W. Kingsley,	Philadelphia and Reading Coal and Iron Company,	4					1
23	Enterprise,	Thomas Baumgardner,	Philadelphia and Reading Coal and Iron Company,				2		1
24	Reliance,	Thomas Baumgardner,	Philadelphia and Reading Coal and Iron Company,	1			1		1
25	Locust Gap,	Graber & Co.,	Philadelphia and Reading Coal and Iron Company,				2		1
26	Franklin,	Lovel & Booth,	Philadelphia and Reading Coal and Iron Company,	2					1
27	Henry Clay, No. 1,	Langdon & Co.,	Philadelphia and Reading Coal and Iron Company,					1	1
28	Henry Clay,	Langdon & Co.,	Philadelphia and Reading Coal and Iron Company,	1		1			1
29	Peerless,	John Cruikshanks,	Philadelphia and Reading Coal and Iron Company,	2	1				1
30	Sterling,	Kendrick & Fulton,	Philadelphia and Reading Coal and Iron Company,				1		1
31	Royal Oak,	Tillet & Son,	Philadelphia and Reading Coal and Iron Company,	1					1
32	Ben Franklin,	Baumgardner & Co.,	Philadelphia and Reading Coal and Iron Company,	2	1	1			1
33	Monitor,	G. W. Johns & Bro.,	Philadelphia and Reading Coal and Iron Company,			1	1		1
34	Cameron,	Mineral Railroad and Mining Company	Mineral Railroad and Mining Company,	3	1		3		1

Characteristics of Collieries in Shamokin District, in 1877—*Continued.*

Number.	Name of Colliery.	Operator.	Land Owner.	Number of drifts.	Number of tunnels.	Number of inside slopes.	Number of slopes.	Number of shafts.	Number of breakers.
35	Luke Fidler,	Mineral Railroad and Mining Company,	Mineral Railroad and Mining Company,	1	1			1	1
36	Hickory Ridge,	Mineral Railroad and Mining Company,	Mineral Railroad and Mining Company,		1		1		1
37	Short Mountain,	Summit Branch Coal Company,	Short Mountain Coal Company,	1			2		1
38	Big Lick,	Lehigh Valley Coal Company,	Summit Branch Coal Company,			1	3		1
39	Morton,	D. J. Lewis,	Northern Central Railroad,	1					1
40	Williamstown,	Summit Branch Coal Company,	Summit Branch Coal Company,		1		3		1
41	Lancaster,	Smith & Keyser,	Mineral Railroad and Mining Company,	4					1
42	Black Diamond,	Swank & Co.,	Henry Saylor,		1		1		1
43	Centralia,	Doctor Provost,	Locust Mountain Coal and Iron Company,		1		2		1
44	Hazel Dell,	Gorrell & Co.,	Locust Mountain Coal and Iron Company,	1	1		1		2
45	Stewartville,	William Montellus,	Locust Mountain Coal and Iron Company,						
46	Big Mine Run,	J. Taylor & Co.,	Locust Mountain Coal and Iron Company,	2					1
47	Continental,	Philadelphia and Reading Coal and Iron Company,	Girard estate,	1			1		1
48	Lilly,	George Troutman,	Locust Mountain Coal and Iron Company,				1		1
49	Buck Ridge,	May & Co.,	Renshaw & Johnson,	2	1		2		1
50	Big Run Gap,	J. Fennell,	Short Mountain Coal Company,	1					1
51	North Side,	E. Miller,	Short Mountain Coal Company,	1					1
52	West Lehigh,	F. L. Shuman,	Long, Lee & Co.,				1		1
53	Glen City,	J. H. Losee,	Longenberger & Co.,				1		1
54	Marshall,	George Roup,	William H. Marshall,	1					1

FATAL ACCIDENTS.

Crushed by Mine Cars.

February 5. Thomas Flynn was killed at Centralia colliery on the 5th of February. The deceased was employed in loading dirt cars under the breaker, and went along with the driver. On returning to the breaker with the empty car, he undertook to detach the mule from the car while in motion, and while doing so fell, the car running over him, killing him on the spot.

James Ryan, killed at Williamstown colliery August 2; age, fifty-five years. The deceased was a loader, and had loaded his car, and was sitting on the gangway side when the train of cars were passing; the last car struck him, killing him.

Edward Updegave, door boy; age, fourteen. The deceased was standing behind an open door, when one of the cars came down from one of the slant breasts, and when going close by the door, the car ran off the track, striking the deceased, killing him.

Charles Shafer, age . . . . . , driver; killed December 21, at West Brookside colliery. The deceased was riding in front of a loaded car, standing on the bumper, and in passing around a sharp curve in the gangway he fell off, the car crushing him so severely that he died shortly afterward.

Falls of Coal.

Leonard Waldroff, miner, aged forty-eight; killed at Ben Franklin colliery, April 27. The deceased was working in a breast, and had blasted out the bottom bench for two or three yards, leaving the upper benches overhanging, without taking the necessary precaution to put up a few short props for his own safety; and while at work underneath the upper benches fell on him and fatally injured him—he died the same day. This accident is another case of gross negligence on the part of the deceased himself.

Andrew Geaghan, age thirty-five; killed at Merriam colliery, May 2. The deceased was with his brother in a breast—the vein being nearly flat—and was filling a small *car or buggy;* while in the act of doing so, his brother told him the top coal was working, and he had better come away; the deceased said he wanted to fill the car first; and while doing so the coal fell on him, killing him.

Bennel Wise, age forty-two; killed at West Brookside, May 18. The deceased was opening a new breast, and had just fired a blast in the bottom bench, which failed to bring down the upper benches of coal. The deceased cautioned his laborer not to go near it, as it was dangerous, yet, strange to say, in a short time he himself went under it with a pick to get it down, and while in the act of doing so the coal fell on him, killing him instantly.

Pat Devlin, age twenty-three, single man; killed at Cameron colliery, May 25. The deceased was working in a new breast when a mass of coal slipped out of side of pillar, killing him instantly.

William Wood, miner, age forty years; killed at Locust Spring colliery, June 21. The deceased was working in a breast, and at time of accident was setting a prop, when the coal fell on him, killing him instantly.

Peter Coles, age twenty-five; killed at Luke Fidler colliery, July 19. It appears, from the evidence given at the coroner's inquest, that the deceased and his partner had fired a blast the evening before the accident, and on resuming work the next day the deceased took a drill to bar down some loose coal, when it fell on him.

Casper Walter, miner, age twenty; killed at Monitor colliery, August 21; was employed in breast No. 19. The deceased was blowing coal off from the side of pillar at time of accident, a thing he had no right to do at that place, and which would not have been allowed had the foreman been aware of it.

Peter McGinley, age fifty years; killed at Big Mine Run, September 10, while working in a breast. At time of accident the deceased was working in the bottom bench when a large piece of coal fell, killing him instantly.

Isaiah Rhodes, age twenty-seven; killed at Bear Valley shaft, September 21. The deceased had fired a blast, and immediately went back to see the effect of the shot, when the coal fell on him, killing him. The deceased had frequently been warned not to go back, after firing, too soon, but he paid no attention to the advice given him, and paid the penalty of his life for his recklessness.

Adam Zeigler, age thirty-five; killed at Locust Gap colliery, October 23. The deceased and his partner were working in a breast, under a piece of top coal and slate, which appeared dangerous. They both examined it, and concluded it was safe. The deceased then resumed work for a short time, when the partition, *slate and coal*, fell on him, fatally injuring him; he died in a short time after.

Charles Mulhollen, age thirty-eight years; killed November 25, at Monitor colliery, by fall of coal while working in breast.

James McAllister, aged thirty-two years; killed December 7, at North Ashland colliery. He was about starting to drive a heading from Breast No. 11 to 12, when one of the overhanging benches of coal fell on him.

George Neithamer, aged thirty-two; killed at Merriam colliery, December 12. He had fired a shot, and returned to dress the loose coal; and while engaged in doing so, a mass of overhanging coal fell on him, killing him.

Thomas J. Williams, aged twenty-two; killed at Cannon colliery, December 17, by a fall of coal. The deceased and his partner had fired a shot. The deceased went immediately back to work, when the coal, which had been loosened by the shot, fell on him. He had often been warned against going back too soon after firing the shots, but he neglected the warning so often given, and paid the penalty of his rashness with his life.

Jonathan Leffler; killed at West Brookside, December 31, aged thirty years. He had recently started work in a breast, and had fired a shot in

corner of breast, which failed to bring down the coal. On going back, he commenced to work out the coal with a drill, when the coal and some overhanging slate fell on him, killing him.

Explosions of Blasting Powder.

Nicholas Rigeway, aged forty-one; killed at Merriam colliery, December 3. The deceased was employed in driving a tunnel, and had bored a hole, in which he placed a charge of Dualin explosive. From the information obtained, he was ramming the Dualin down in the hole with a stick of wood, when it exploded, killing him instantly.

Falls of Roof.

John Collins, boy, aged seventeen. He was employed in coupling cars at foot of hoisting slope, at Tunnel colliery, Ashland, when a thin shell of rock fell from the top, killing him. No notice of any danger to be apprehended was visible, the surrounding strata being very firm and solid.

John Larkin, miner, aged fifty; killed at Henry Clay colliery, October 23. The deceased was engaged, at time of accident, with three other miners, in taking out some timber, preparatory to putting in new ones. The place had been examined a short time previous, and thought to be safe, until the new timber could be put in. In this they were all in error, as a piece of slate fell on the deceased shortly after, so fatally injuring him, that he died in a short time.

Miscellaneous above Ground.

Lathiel Symons, aged twelve; fatally injured September 28, at Henry Clay. The deceased was employed in watching and keeping the pea coal-chute clean; the coal being delivered into the chute from elevators; the deceased was sitting on a plank on top of chute. While engaged in this duty, he slipped off of the plank, his leg getting jammed between the main screen, revolving immediately under him, and the frame work, crushing his leg, and requiring amputation. The deceased lingered for several weeks before he died, from the effects of the accident.

Miscellaneous Under Ground.

Thomas Connor, aged eighteen; killed December 21, at North Ashland colliery. The deceased and his father were working together, on the night of 17th, driving a heading across, into a man-way. They had driven a short distance from the man-way side, and then went to the opposite side, in the pillar. After working a short time, the father of the deceased sent him back again into the man-way, to rap on the pillar. The deceased not coming back, his father went in search of him, and found him at the lower battery, not dead, but fatally injured, so that he died in fifty-two hours after.

Andrew Cosgrove, aged forty-five; killed at Preston No. 2 colliery. He was engaged in starting a battery which was blocked with coal and slate, and while doing so a heavy rush of coal came down, breaking a portion of the battery and killing him.

John Chappel, aged thirty; killed at Short Mountain colliery, *east side*. The deceased and Mr. Constantine, a contractor, had been up in some of the old breasts to look for coal, and on coming down to the bottom of the breast, Constantine went down to get oil for his lamp, leaving the deceased sitting on a large rock, which slid down into the chute and crushing him severely, he died in a short time after.

Pat McNanaman, aged forty-five; killed October 30, at Preston No. 2, by rush of coal while starting battery.

John Young, aged thirty-four; killed October 11, at Cameron colliery. The deceased was working with his partner in breast No. 59, *east water level*. They had fired two shots which were heavily charged with powder, and had retreated into a small unfinished heading up near the face of breast, where a quantity of powder smoke had accumulated after the shots had exploded. The deceased and his partner then started down the man-way with the intention of going home; the deceased going down first, his partner following a short time after, but feeling himself about to be prostrated from the effects of the smoke, he clung fast to the steps in the man-way for a short time until the powder smoke had passed by him, when he partially recovered and then went part way down the man-way where he found the deceased, Young, lying dead. Considerable feeling was created by this accident, and a disposition to blame the mine officers and the inspector at the same time. At the coroner's inquest the witnesses all testified that the ventilation was good, and the surviving partner, Jonathan Tillet, also testified that if they had retreated down into the second heading, after firing the shots, the accident would not have occurred. The jury were very much divided in their opinions, but after being out for twelve hours or more, they at last rendered a verdict that the deceased came to his death from not using proper precaution in providing for his own safety.

Table of Accidents in Shamokin District, in 1877.

ACCIDENTS.	Falls of coal.	Falls of roof.	Explosions of carbureted H^2 gas.	Explosions of blasting powder.	Crushed by machinery.	Crushed by mine cars.	Miscellaneous under ground.	Miscellaneous above ground.	Totals.
Fatal,	15	2	. . .	1	. . .	4	5	1	28
Non-fatal,	27	4	7	6	2	13	5	2	66

Recapitulation.

Number of drifts,	46
Number of tunnels,	23
Number of inside slopes,	6

Number of slopes,	52
Number of shafts,	5
Number of breakers,	54
Number of horse-power used,	18,009
Number of pumps,	90
Number of fans,	46
Number of boilers,	667
Number of men and boys employed,	10,857
Number of tons mined in 1877,	3,471,562
Number of tons mined in 1876,	3,208,306
Increase of tons in 1877,	263,256

Coal produced in Tons, and number of Persons employed in 1877.

Remarks.	1877.	1876.	1875.
Coal produced in tons per year,	3,471,562	3,208,306	3,348,726
Number of persons employed,	10,857	10,652	9,585
Number of lives lost,	28	37	38
Ratio of persons employed per life lost,	388	288	349
Ratio of coal produced per life lost,	123,984	86,711	81,282
Ratio of coal produced per person employed,	320	282	348

Number.	Occupation.	Age.	Widow.	Children.	Cause of Injury.	Fire-damp explosions.	Falls of roof.	Falls of coal.	Explosions—blasting powder.	Crushed by mine cars.	Miscellaneous under ground.	Miscellaneous above ground.	Total accidents.
1	Driver,	15	Single.	...	Run over by dirt car,	...	...	...	...	1	...	...	1
2	Miner,	48	1	3	Fall of coal,	...	...	1	...	...	...	...	1
3	Miner,	42	1	6	Fall of coal,	...	...	1	...	...	...	...	1
4	Miner,	35	...	...	Fall of coal,	...	...	1	...	...	...	...	1
5	Miner,	23	Single.	...	Fall of coal,	...	...	1	...	...	...	...	1
6	Starter,	45	...	3	Killed while starting a battery,	...	...	...	...	...	1	...	1
7	Boy,	45	...	...	Fall of roof,	...	1	...	...	...	...	...	1
8	Miner,	30	1	3	Crushed between pillar by piece of rock,	...	...	...	...	...	1	...	1
9	Miner,	40	1	4	Killed by fall of coal,	...	...	1	...	...	...	...	1
10	Miner,	25	1	...	Killed by fall of coal,	...	...	1	...	...	...	...	1
11	Miner,	55	1	1	Crushed by car in gangway,	...	...	...	...	1	...	...	1
12	Miner,	20	...	...	Killed by fall of coal,	...	...	1	...	...	...	...	1
13	Miner,	50	1	9	Killed by fall of coal,	...	...	1	...	...	...	...	1
14	Miner,	27	1	...	Killed by fall of coal,	...	...	1	...	...	...	...	1
15	Slate-picker,	12	...	...	Killed by machinery in breaker,	...	...	...	...	...	...	1	1
16	Miner,	34	1	3	Fell down chute,	...	...	...	...	...	1	...	1
17	Miner,	45	1	6	Killed by rush of coal at battery,	...	...	...	...	...	1	...	1
18	Miner,	35	1	3	Killed by fall of slate partition,	...	...	1	...	...	...	...	1
19	Miner,	50	1	...	Killed by fall of roof,	...	1	...	...	...	...	...	1
20	Door-boy,	...	...	...	Killed by being crushed by mine cars,	...	...	...	...	1	...	...	1
21	Miner,	38	1	5	Killed by fall of coal,	...	...	1	...	...	...	...	1
22	Miner,	41	1	2	Killed by premature explosion of blast,	...	...	...	1	...	...	...	1
23	Miner,	32	1	3	Killed by fall of coal,	...	...	1	...	...	...	...	1
24	Miner,	32	1	2	Killed by fall of coal,	...	...	1	...	...	...	...	1
25	Miner,	22	...	...	Killed by fall of coal,	...	...	1	...	...	...	...	1
26	Laborer,	18	...	...	Killed by falling down man-way,	...	...	...	...	...	1	...	1
27	Laborer,	...	...	...	Killed by being run over by cars in gangway,	...	...	...	...	1	...	...	1
28	Miner,	30	1	3	Killed by fall of coal and slate,	...	...	1	...	...	...	...	1
						...	2	15	1	4	5	1	28

Fire at Short Mountain Colliery.

A fire broke out in this colliery on the 1st day of January, 1877. Since which time no coal has been sent to market. The origin of the fire has never been definitely ascertained.

From information obtained from the engineer employed in running the lower pump, it appears he was called away, up to what was known as No. 6 pump, one lift above, and he thinks the fire was started from a spark of his lamp dropping among some dry wood or other inflammable matter, and was positive the fire was started at bottom of slope, on the east side, about fifteen hundred feet below the surface. The fire commenced about three o'clock on the morning of the first of January, and raged fiercely until two o'clock the next day, when it was discovered to have ignited in the lower pump slope nine hundred feet, and up through the Bull pump slope six hundred feet to the surface, burning down the engine-house and closing the slope. The Short Mountain slope, which had hitherto been the intake or downcast, now became reversed, the flames now coming up through this slope to the surface, burning out the timber very rapidly closing it up. A stream of water was conducted into it on the morning of the 5th. Some large hose was at once procured and attached to the column of one of the steam pumps, conducting the water down in sufficient quantities to prevent the fire from getting into the Lykens Valley slope eastward. The fire being met by large streams of water on its eastern and western sides, no further danger of its spreading was anticipated.

A large force of men were at once put to work to extinguish the fire in the various gangways, air-courses, and flue-ways which were found burning, the heat being intense, the men having to work under great difficulties from heat, vapor, &c., but finally succeeded in extinguishing the fire in the interior of the mine, which had been slowly but surely filling up with the waters of Bear creek. After forty days the fire was considered to be entirely quenched, the work of re-opening the mines was commenced, the pump and hoisting slopes were re-opened and timbered, and the gangways at the present time are being re-timbered, preparatory to resuming operations in 1878.

The work of repairing the damage done by this fire was both dangerous and costly, but was brought to a successful termination. No lives were lost, only one person injured, (arm broken.) by a fall of rock, and when resumption of work takes place at this colliery it will be a great blessing to the workingmen who have had to endure a great may privations by being thrown out of employment in consequence of this accident.

North Ashland, formerly Union Colliery.

This colliery is located one mile east of Centralia, at Dark Corner. It was formerly operated by Messrs. Anderson & Ryon, but during this year it passed into the hands of the Philadelphia and Reading Coal and Iron Company, who have made considerable improvements on the colliery,

looking to an increased production of coal. It may now be classed as one of the best and most productive collieries in Columbia county.

Peerless Colliery,

Located on southern edge of Shamokin borough and operated by Mr. John Cruikshank.

This consists of one tunnel and one drift opening, cutting the No. 10 vein, on water level; also, a red ash vein, No. 12. Another drift is driven into a pink ash vein, while another tunnel is now driving to another red ash vein, making four veins above water level. Twelve thousand tons were mined at this new colliery in 1877. Measures are now being taken to mine and send 50,000 tons in 1878, and judging by the *vim* and energy displayed by the present lessee, Mr. Cruikshank, every ton will be taken out that can be got, if energy and attention to business will do it. Great credit is due to the present lessee for his perseverance under discouraging circumstances, during the depressed state of the coal trade.

Improvement at Bast Colliery.

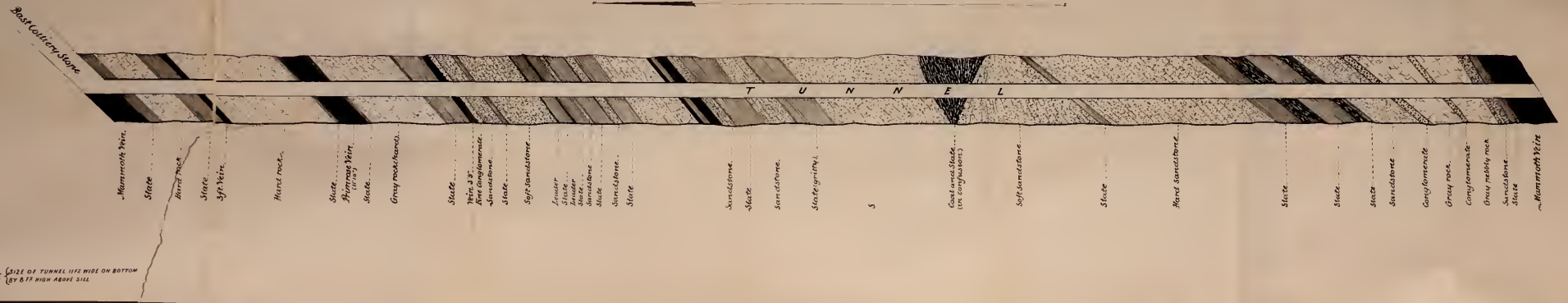
A tunnel has been driven south 800 feet, cutting the Primrose vein, 11 feet thick, and two other smaller veins, besides an inverted dip of the Mammoth, and finally reaching the Mammoth vein, in the south dip in the Ashland basin. At this point, the vein is in exceedingly fine condition. The lift above the tunnel level has not yet been ascertained, but will be, it is expected, about 200 yards.

Together with the lift, yet to be reached by the slope, this will place the production at this colliery, beyond doubt, for many years to come, and should be a source of congratulation to the Philadelphia and Reading Coal and Iron Company, as well as to the workingmen in the immediate vicinity, who are largely dependent on the welfare and prosperity of the collieries.

A cross section is appended hereto, showing the measures intersected in the tunnel, and their angles of inclination.

CROSS SECTION THROUGH BAST COLLIERY TUNNEL

SCALE 30 FT PER INCH



NOTE { SIZE OF TUNNEL 11FT WIDE ON BOTTOM
8FT 8 FT HIGH ABOVE SILL

SECTION THROUGH EAST COLLIERY TUNNEL

SCALE 30 FT. PER INCH

LUZERNE AND CARBON COUNTIES,

MIDDLE DISTRICT.

Office of Inspector of Coal Mines,
Wilkes Barre, Pa., *February 25, 1878.*

His Excellency John F. Hartranft,
Governor of the Commonwealth of Pennsylvania:

Sir: I have the honor to submit herewith my annual report, for the year ending December 31, 1877, being my seventh annual report, exclusive of the one for 1870, which covered only a fractional part of that year.

I flatter myself with the idea that the condition of this district, at present, in a general way, is good. To say that it is perfect, I do not mean, as there are, at all times, sections, even in the best managed mines, deficient in one thing or another. Sometimes this is unavoidable, but it is not always so. And in the writer's opinion, each mine ought to have a thorough inspection, at least once in each five or six months that the said colliery was operated.

There were thirty-eight (38) lives lost in this district during the year last past, against fifty-five in 1876, sixty-three in 1875, fifty-seven in 1874, forty-six in 1873, forty in 1872, and fifty-three in 1871. This shows that the death roll is decidedly less than it has been since 1870, that of 1872 being the nearest. And, further, not since 1871 have the fatal accidents from explosions of carbureted hydrogen gas (fire damp) been so favorable, having escaped with losing but one life during the year, notwithstanding that the mines of the district generate probably as large a *constant* volume of said gas as any other mines in the known world, reaching to thousands of cubic feet of pure gas per minute, requiring powerful ventilation, and an ever vigilant care and attention on the part of the mine officers and workmen.

It is but just to mention here, that the mines in the district were not in operation a good part of the time, during the year, caused by the depressed state of the coal trade, which finally resulted in a clash between operators and operatives, in the shape of a prolonged strike, thereby reducing the production. It is the opinion of many, however, that the coal production, in the aggregate, was about the same at the end of the year, and that the only change caused by said stoppage was in the proportions or ra-

tios of the different regions, of the said total. It is very evident that Luzerne, in this case, was the loser, and just as evident that the Schuylkill and Lehigh regions were the gainers, as their respective tonnages prove.

During the year, 3,836,164 tons of coal were sent to market, and 244,163 tons sold and consumed about the mines; total of 4,080,327 tons; against a total production of 4,615,384 tons in 1876. This shows that 107,377 tons of coal were produced in 1877 per life lost, against 83,916 tons in 1876; an increase of 23,461 tons per life lost=27.7 per cent.

The collieries only averaged 135.82 days of actual work during the year. This proves that if the district, when working 135.82 days, could produce 4,080,327 tons, then it could have produced 9,012,600 tons, had there been 300 days worked; thus leaving only 13 days for holidays and stoppages from breakages, &c. Besides this, there were a number of collieries idle in the district during the year. Were all those in operation, the capacity of production would be increased considerably, probably a million tons more.

The accidents are arranged in a tabulated form, both fatal and non-fatal. The fatal accidents are described and treated more in detail, under the respective heads under which they are classified, in the descriptive part of the report; also, plans and sectional views are furnished, to assist in their explanation, in two cases.

Considerable attention and space is here given to explain the position of the writer, in his official capacity, in relation to complaints of workmen and of operators, with a sample or *fac-simile* of one of the many anonymous communications received from time to time.

Also, other matters are treated of, which, in the writer's opinion, bear directly or indirectly upon the "health and safety of persons employed in around the coal mines" of the district.

Very respectfully submitted,

T. M. WILLIAMS,
Inspector of Coal Mines.

Mines on Fire.

THE EMPIRE OLD MINE, formerly called the Kidder slope, is still closed in, and a watch of one person is still kept upon it; the fire is near the crop of the seam, in old caves, &c. The inclosure, however, extends to, and is adjoining their present workings. I requested Messrs. John T. Griffiths and L. S. Jones, the company officers, to see to it that the whole periphery of said inclosure be examined daily, except the surface, to the end that every thing may be kept safe from any caves or breakages in the enclosure around said fire, with its poisonous gases, for fear that they escape and mingle with the air entering any portion of the working mine.

BALTIMORE OLD WORKINGS.—These are still burning to some extent, and a small force of men keep watch on the same, fearing it may break out, or that a cave may suddenly take place, causing the carbonic acid gas

therefrom to fall and intermingle with a current of fresh air, and be drawn into their other workings.

Ashley Colliery Fire.—This colliery has been the scene of a serious fire this year, necessitating the flooding of that portion of the mine where it occurred, called No. 3 slope, being the deep workings on the Baltimore seam. This fire occurred, it is stated, from the gas igniting from a miner's lamp; he having, a short time previously, fired a blast, and on his return to the face of the gangway, where he worked in company with his laborer, the gas ignited along the roof, and all efforts towards extinguishing it failed, on their part. They then went out of the mine to report and seek assistance. In their excitement they forgot to call upon, and inform another party of men driving a gangway and air-way in an adjoining part of the same mine; and it was with great difficulty that those men made their escape, the gas affecting them so seriously that two of their number were left prostrated on the gangway, while the other two went wending their way, as best they could, to escape its deadly contact, and to send succor to their dying comrades. Fortunately they were met on the way by a fresh gang of men from the surface, and assistance rendered just in the nick of time to save the whole party, thus averting the loss of any human lives in this catastrophy. It was found that the fire had made such headway that the only way to be certain of its speedy extinguishment was in the flooding of the deep slope where the fire existed; an operation requiring some weeks of time, to say nothing of the many months of time to be taken in pumping the same out of the mine to enable them to resume mining operations again.

Mine Improvements.

Improvements in mining, as in other branches of business, have been very limited in 1877.

Maltby Colliery.—C. S. Maltby has not done anything towards completing his circular shaft, but has erected a new breaker near the old shaft. North-easterly from the same, a new shaft is being sunk to be used as a second opening, pumping, and ventilating shaft, in conjunction with the old one. Also, he has driven the tunnel on the mountain side further on, and penetrated the Cooper, Bennett, and Ross seams, some of which, it is said, are in very good condition. It would appear, from the very extensive improvements going on at this colliery, that it is destined to be one of the finest on that side of the river. There is about 600,000 feet of lumber in the said new breaker, and contains, it is claimed, all the modern improvements to be found anywhere in said branch.

No other improvements of importance were done in the district during the year.

Second Openings.

The Conyngham shaft, Delaware and Hudson Canal Company, the Nos. 1 and 2 shafts of the Susquehanna Coal Company, are the only shafts now

in operation, not in communication with and having a lawful second opening. Each of those places are being operated according to law, by confining their operations to labor required to make or facilitate the making of a second opening; and the last named, at least, will have had a connection made to No. 1 slope, ere that another report will be made relating thereto.

Steam Boiler Explosions.

An explosion of a steam boiler in one of the nests of boilers in use at the No. 1 shaft, Delaware and Hudson Canal Company, near Plymouth, occurred, which destroyed considerable property; but it so happened that no person was injured or killed thereby. It was only by good luck that the fireman was saved in this case, as he had just turned out of the boiler-room. The usual *matter of form* report of the safe condition of said boilers had been filed in this office in proper time. I say matter of form, because I claim that our present examinations are not conducted, in all cases, as they should be; neither are they made, in many cases, by boiler makers or other *qualified persons*. Some persons assuming the responsibility of shielding themselves, as they suppose, behind the wording "or other qualified person." I am inclined to the belief that should some of those parties happen to be called up before a court of justice, and there be required to explain in regard to their assumed qualifications, that they may come to the conclusion that they were carrying too much responsibility, by endeavoring to save a few dollars to their employers, and at the same time earn for themselves a little honor, at the risk of sacrificing the lives of innocent men and boys, and finally their own reputation.

I am still of the opinion, expressed in my other reports, that steam boilers, and all machinery, in and around the coal mines, should be placed under separate inspection; or, otherwise, that there should be a law requiring that each steam boiler, employed in or about the mines, should be insured in a responsible insurance company, when that they would receive *proper* examinations.

I am sincerely afraid that there may be some terrible catastrophe in some one of those districts yet, before that the Legislature has awakened to this danger. Then public opinion will raise a cry for a proper system of boiler inspection.

This being an imminent danger it ought to be provided against in time. I intend to call attention to this matter, in each annual report, unless the cause be removed, that I may have the honor to make.

Inspectors' Annual Reports.

These reports being intended for the perusal of those connected with mining coal, both in the branch of excavating the mineral, as well as those who have the managing of the same, then it is but a simple fact to state that there is not one tenth the required number of those had for distribution among our people connected with the mines. Every miner, and every

officer, of whatever grade, from the fire-boss up to and including the superintendent—in fact, each operator and land owner—should be able to secure a copy, if they so desire, of these annual reports, as they contain certain matters of much interest to them all, in some particular or other. There are upward of three thousand of actual miners employed in this district, and about four or five hundred officers, having charge of about fifteen thousand persons.

Now, then, should each of these officers and actual miners be supplied with a copy of these annual publications, it would require about thirty-five hundred for this district, whereas, at present, the Inspector receives only eighty-three (83) copies for distribution; and only through the good efforts of Honorable H. B. Payne, while serving in the Senate, in 1875, did we succeed in having that many. It is true that the Senators and Representatives have a certain number for similar purposes, but it is hardly worth mentioning, among their large constituency.

These reports are the only State literature that our miners care anything particularly about, except the reports of the statistical bureau, which they would also like to be in possession of annually.

Our miners and mine officers are charged with being ignorant, careless, reckless, and incompetent, &c., &c.; and these reports having more information upon the art of mining anthracite coal than any other book or magazine published, and every one of our public men agree that our mining population should be better educated, then, I say, why do the State authorities not publish a sufficient number of these reports to supply the demand for them, that they may be better posted in the matter of their calling, free gratis; or, otherwise, charge a price for them sufficient only to pay the expense of their publication, thus giving all persons desirous of such information an opportunity to get the same. There are hundreds—yes, thousands—of our mining population that would be very glad to have an opportunity of securing an annual copy of these reports, that have been deprived of doing so, although willing to pay any reasonable price for the same.

To the scientific, these reports may be of no great value; in fact, they were never intended for such, being created by a class of persons who have devoted more time to the actual art of mining, than to that of book-making relating to the same, or upon any other subject. I close this appeal, by saying that I hope that some of our legislative members will take this matter up, and act upon these humble suggestions for the reasons above advanced.

Legal Proceedings.

On the 14th day of November, a laborer named Richard Coon, working for a miner named Patrick Langan, in the No. 1 shaft, Kingston Coal Company's mines, was so seriously injured by fall of coal from roof that he died of his wounds the following day.

In section nineteen of the mining law of 1870, the miner is required to

keep his place properly propped and timbered. Neglecting or refusing to do so, he is liable to be tried for misdemeanor, and upon conviction *shall be punished by imprisonment and fine*, at the discretion of the court. Section eight, of the same law, requires the operator to employ a competent and practical inside overseer, to be called mining-boss, who shall keep a careful watch over the * * * * timbering, to see, as the miners advance in their excavations, that all loose coal, slate, or rock overhead is carefully secured against falling * * * * and all things connected with and appertaining to the safety of the men at work in the mine.

The report of the said accident contained a statement that the miner had neglected and refused to timber his place, and that the accident to the man Coon was the result of the same. On investigation I found the statement was correct. I also came to the conclusion that the mine boss had not complied with the requirements of the law, under section eight. I therefore had the miner, Langan, and the boss, Davis, bound over to court. In due time, true bills were found by the grand jury against them, and the cases will be called up in the January term of 1878.

Patent Squibs.

These devices are being used to a considerable extent through the district, and I am sorry to say to the detriment of our miners using the same, according to my humble opinion. I am more convinced than ever that they are not as safe as their inventors intended they should be, nor as much so as many persons using them think they are. Mr. Richard Roderick, now a mine-boss, while yet working as a miner, one day had a blast to miss fire, as he called it, when using these patent squibs, and after due time, having already heard the squib explode, advanced to the face of his working place, and, as miners always do, put the iron needle into the hole, and when he drew it out again, behold it had the patent squib upon its point, and had part of it on fire. Fortunately for Roderick, he had not pressed that part containing the fire on to the powder, otherwise the blast would have been exploded, and a life lost in the case, (as it likely would have been,) and charged to a premature explosion of a blast, as these accidents are frequently called.

Another incident, in this connection, was related to me by Mr. John E. Cook, a mine-boss. While on his rounds through the working places through the mine he came to his brother's place, who was driving a chamber, and was about to put off a blast. The miner prepared and ignited the match attached to the patent squib that he was using, and made his way to the cross-cut, where the two brothers waited to hear the blast explode. Finally they heard the squib explode, but not the blast; they then pronounced it a miss fire, and waited a moment or so, and started into the chamber, when, to their great surprise, the blast exploded; luckily for them, however, they had not reached very near the face, and thus were saved by a mere chance.

The above two cases and many similiar incidents are strong arguments against the use of these patent squibs; they are so, in my mind at least.

Patent Miner's Cartridges.

These useful articles, although intended by their manufacturers and purchasers to throw an additional safeguard around persons, while handeling and using blasting powder, in my opinion have not been of any advantage in that direction.

In fact I have witnessed more exposure of the men and boys in the mines, since the introduction of these cartridges, by far, than I ever did before.

As I mentioned in my last report, these cartridges have been tied up in bundles, containing twenty-five (25) pounds of powder each, and carried into the mines with a thin covering, of a sheet or less of paper, binding them together, and thrown around, one bundle here and another somewhere else. After the miners get these to their working places it is no better, as they are then untied and scattered promiscuously, some in their boxes, if they have any, others on the lid alongside, and sometimes lying open upon the paper that they had been brought in into the mine. The next party will keep an old powder keg, with one end open, and then they take the powder from these cartridges, and pour it into the said open-ended old powder keg, after which these paper cartridges are used as they need them. Very frequently the miners can be seen filling one of their cartridges of a different diameter from those which they were furnished with the powder, having their lamps upon their heads. In fact, I have been horrified to see men of fifty-five or sixty years of age undergoing such uncalled for risk, and when calling their attention to it to be subjected to their derisive laughter.

I have given the following orders: That each party having charge of a working place in a mine, shall have a wooden box, commonly called a *miner's box*, to keep their supply of blasting powder in, and said box shall *not* be, as was the usual custom, kept along side the car track, either in the gangways or chambers, unless it be in some case *temporarily*, when the *mine boss* is satisfied it can not be avoided for want of sufficient room to place the same while opening out a new chamber or working-place, and then only by the consent of said *mine boss*. Also, that each box shall be kept closed by a proper lid at *all times*, unless while taking out or replacing the said supplies.

I have notified the officers, that if any person is injured or killed through the neglect or failure to carry out the latter order, that the matter would be referred to the court, let the guilty parties be the officers of the mine, or the workmen. I do this to endeavor to break up an old custom of keeping their supply of powder immediately alongside the traveling roads, or car tracks, both in the gangways and chambers. Sometimes they have a box, other times nothing but open kegs, or otherwise the patent cartridges. This system is very dangerous to passers-by, whoever they may be; but the worst feature, perhaps, connected with it, is this: There are so many young boys employed inside, as drivers, assistant drivers, car runners, and

door boys, attending to closing and opening of the doors, ranging in age from twelve years upwards, who pass to and fro so close to these small powder magazines, that they can stand upon the track and place their hands right into those boxes or kegs. This is too tempting for boys, as they frequently take powder in the manner just described, and play with it, resulting sometimes in serious injury or death. I have had to record two cases of a serious nature during this year, as can be seen in the list of accidents. Two boys working in the West Nanticoke colliery, also two boys working in the Nottingham colliery, were very seriously burned from powder that they had appropriated to themselves from some of the miners.

I would here say, that if the miners would not take almost unbounded liberty, and become so careless in the handling, and transporting, and using of these cartridges, they could not be considered objectionable. The objections come in, in their being packed into wooden boxes, containing two or more kegs. This necessitates their being opened and their contents divided, as the miners will not, voluntarily, take more than one keg, or its equivalent at one and the same time, as it may get damp, &c. In the said division, one party gets the box—unless it is the custom to take it also away from the men—and the other has to take the other portion tied up in paper as before described.

Blasting by Electricity.

Of late years most of our rock miners use the *Frictional Blasting Machine*, as furnished by the Laflin & Rand Powder Company, and those that have begun their use could not think of doing without them, if it were possible to have them at almost any cost, on account of the economy and safety they afford in doing any amount of work with ordinary care. In my annual report for 1876, I recommended the substitution of the electric method of blasting coal as well as rock, instead of the very expensive and life destroying system now in general use in coal mining. Since that time, I have not been able to have had the matter put to a *new* test in coal mining, as I then fully intended to do. It is true that the number of lives lost in this district was not as large in 1877 as in 1876, there being three lives lost in the former and ten in the latter, yet the great number of persons injured by the same cause prove about the same old story. The general average of the item of killed by blasts for the last five years, as may be seen from the table, is 11.2 per cent. of the whole number of lives lost, *i. e.* two hundred and fifty-nine lives lost, and, out of that number, twenty-nine were destroyed by our present system of blasting, to say nothing of those crippled, many of them for life.

Complaints of Workmen.

My first commission was dated July 19, 1870, since which time up to the present, I have been the recipient of a goodly number of letters from the workingmen, presenting features in the list of said complaints, that are sometimes real and other times imaginary, and again about matters over

which I had no control. There were many of these communications clothed in courteous and appropriate language, calling attention to what seemed to them, a cause of complaint. To all of such I have always paid the promptest attention, as the date of the receipt of the same, which I have reserved, and my books will bear me out.

The said communications were sometimes signed by the person sending, or, other times, by a ficticious name or names, or else anonymous. To this matter, whether they were accompanied with a proper name or not, I made no difference. Among the letters above referred to, a large portion were not worthy of any attention, from the coarseness of language employed, the insinuations and personal abuse, and threats that they contained, and being invariably anonymous. Even to these *undeserved insults* I have always given my attention, for fear that there were some worthy persons suffering from the effect of the causes, if any there be, complained of and, in several instances, I found that I had been imposed upon. The said imposition caused me to threaten to give no more attention to such notes, unless properly attested, and so acted in one case for a short time. I subsequently reconsidered my resolution on this subject, knowing that a great many worthy persons would sooner suffer from whatever wrongs that there might be in connection with their matters, rather than send to the mine inspector, or any one else, complaints over their own names, for fear that by any means the superintendent or mine-boss should ever suspect them of having done so.

There is no denying the fact that many, indeed we might venture to say the majority of our mine officers, would think it sufficient cause to use their various means of ridding themselves of any person sending complaints to the inspector, as they think it is intended to damage their reputation or to give them a little extra trouble. They would not say so, perhaps, nor discharge him suddenly, but would find some pretext to do so, which would only be a cunning way of discharging him after all. I am sorry to say that many of the mine officers resort to the meanness above referred to, and frequently persecute persons wrongfully, and the result is just what I have stated above, of persons suffering rather than to make their grievances known, fearing a possibility of their being even suspicioned, and no doubt but there are more persecuted and discharged upon mere suspicion than upon proof. It may be asked here, why do these men fear exposure by sending or making their grievances known to the inspector? Does he make those complaints known to the mine officers or operators? I will here answer this for myself, that I may have stated at different places and times, that I had received complaints relating to certain matters, but I *never* gave a communication, nor any *name*, verbally or in writing, of *any* person sent to me, to any operator or other mine officers, nor gave them to understand, either directly or indirectly, who had informed me of any matter made a complaint of. Now, then, how can it be explained, that the names of persons most forward in speaking their sentiments relating to

different things in and about the mines, and that do write, occasionally, to the inspector, become known to the mine operator or his officers? I would state that there are always parties connected with every mine that act the part of a telephone to these officers, pretending that it is done for the love they have towards the said officials, when it is altogether in their own interest it is done, and at the expense of any person coming within their reach; and, as I intimated before, these loud talkers are not very particular who hears them, and seldom think so mean of their fellow workman as to suspect any one of them of treachery, unless he has been known previously to squeal. This, together with the fact that the officers, or any one else, are able to connect words and sentences, heard incidentally, and thereby infer the result, is sufficient to give them a clue of all that is going on, with a few errors from suspicions and false representation, by the said telephones, who are generally the drones of the said mine.

It is true that there are some workmen, it matters not how things are conducted, they have a grievance at all times against some person; and, as a general rule, these are the most inferior of all the workmen, yet they are the ones that have all the complaints to make. They cannot earn as much money as their neighbor, and everything is wrong; and, in their estimation, the officers are a great deal to blame for this state of things. Finally, one of these much-abused fellows undertakes to call the attention of the mine inspector to such state of things; and, before he has fairly stated his complaints, he generally commences to abuse the said officer, charging him with incompetency, neglect, and bribery, and pours out his threats in abundance. The next bad feature with that class is this: They cannot keep their own counsel, and they finally threaten the inspector upon their officers, either in their absence or presence, who seem to think such as an unpardonable sin, as they think they are tending to their business in a proper manner, whether they are or not.

Any such person is very likely to earn for himself a discharge. Then, if he has written a line or spoken a word to the inspector relating to the condition of things in or about the said mine, the inspector becomes the scape goat for the whole affair, when in reality the party have caused it themselves through their own indiscretion.

In regard to the charge of exposing the names of persons who may have sent me word relating to causes of complaints, &c., I will reiterate my former words, that no case of the kind has ever occurred in my district during my term of office, notwithstanding that such has been insinuated and talked in my absence, to all of which I defy the slightest proof from any source whatsoever. Another thing charged is this, that mine officers receive notice of the intended visit to examine the condition of the mine. I now give the same unqualified denial and challenge to this that I did to the other misrepresentation. As a matter of course, I have told mine officers openly, when giving them a certain time to rectify any matter complained of, when an examination was made, that I would be there again about the

time specified to see if they had complied, but not when going to make a general examination of any mine.

The mine officers in my district cannot possibly have any idea of the time of the inspector's visit, unless they should guess at it from seeing him passing to neighboring mines, and judging from the time of his former visit, that it may not be a great while before he pays them a call. I am decidedly of the opinion, that they ought not to know anything of the intention of the inspector to visit their mine, in order that they might be prepared at any time for such inspection, and, I think, such a course is better for all concerned; hence I always make my visits when it suits me best so to do, having some regard to the time and relative number of general examinations to the respective collieries of my district.

I would say right here, that I have always told the workmen in the presence of the officers, that I considered it, not only their privilege, but their *duty* as well, to call my attention to any imminent danger to the health, limbs, or lives of any person in or around the mines. I say further, that they should first call the attention of the mine officers to the threatening danger, thereby giving them an opportunity to provide against such a case. But, that if they do not then attend to the matter within a reasonable time, to inform me of the facts in the case.

In reply to this, it is claimed that workmen dare not do so for fear of persecution from the said officers. I say there may be some of those petty *tyrants* that would thus act (these are only the exceptions,) where the matter would be done in an open and frank manner, yet their attention may be called to any cause of complaint, courteously and honorably, without exposing the actor in the premises at all.

There is just as large a percentage of honorable and trustworthy men amongst the workmen and mine officers as there is amongst a similar number of any other class of people, to be met with in other branches of business.

The natural consequences of these little petty grievances are to detract from the harmony of the whole body. The workmen blame mine officers, almost without exception of being guilty of such games of tyranny as I have pointed out above, and much more, when in reality it ought to be confined to the few of limited caliber and low standard generally of managing qualifications, of which each district is cursed with more or less. In the next place, the mine officers generally, are inclined to think too meanly of their workmen, because a few of them, in their ignorance, have in some manner or other done them, what they call a great injustice, and they thereby condemn the innocent with the guilty, making but little descrimination.

The third link in this matter, is in connection with the *inspectors*. They are much abused frequently for things they know nothing about, and just as often about things over which they have no control. When an inspector has over one hundred openings, and when they extend for a distance of twenty-six miles in length, by a width of three to four miles, covering an

area of over one hundred square miles, and, where an aggregate number of fifteen thousand workmen are employed, two thirds of the same being employed inside the mines, then, I say, he cannot make very frequent visits, as he has to attend to all serious or fatal accidents, examine into and record their causes, &c., receive, examine, and record all reports of air measurements, which are made weekly in each mine, and reported monthly; all accident reports, steam boiler reports, testing of safety catches, and bridle chains, besides attending to the extensions of each map or tracing of each mine in the district, once in each six months.

To attend to the above requires a good deal of time and attention, as there are many communications to be written in connection therewith, besides what is above mentioned. There are many communications required relating to the condition and required improvements of the mines after the different visits.

Considerable time is required to attend to law suits sometimes as a witness, in cases between the working and their employer, being mostly subpœned on both sides and requiring as high as six and eight consecutive days in the one case; and again, when it becomes his duty to bring suits for violation of the law, against the one party or the other. In such a case he has to spend the time necessary to bring the case before the alderman, and next to spend one, two, or three days before the grand jury waiting, and probably a week more before the court. So that much of the inspector's time is spent in matters relating to his business, of which the ordinary workman has no idea; yet he, the inspector, is compelled to do so. Once a month he must make out a report to the clerk of the mining district. He has to make an annual report of his doings to his Excellency the Governor, which requires considerable time, as he has to attend to the matters of accidents as usual, and which requires a goodly proportion of the time, when the fatal cases reach as high as six, seven, eight, nine, or ten in one month. Besides all the above, he has to keep a day book, in which he records all matters that come under his supervision during his examinations, and, in fact, is to contain notes of all his doings.

The writings of the office, are more than many have to do, for a regular salary. Many of the workmen have an idea that an inspector has nothing to do, except be in the mines all the time, and imagine when they see him not donned with his mining uniform, that he is surely neglecting his duty, &c.

It is also thought by many of the workmen that an inspection of each mine should be made very frequently; some have mentioned as often as once per month. In my opinion, such a course would simply be saddling the responsibility upon the State officers, when they have not the control necessary to have everything as they desire, nor an opportunity to see it carried out in its details; and this would create a shield behind which the mine officers would take refuge. If an inspector is able to make a general

examination of each mine once in each four months that the mine works, or thereabouts, and makes that one to count, it is as much as should be required—after that a mine has been put into good condition. It is possible for an inspector to visit a mine much oftener, and yet for that mine not to be in good condition. It depends what those visits amount to, as well as how often they are made.

Sometimes the men find something going wrong in one of the one hundred mines in this district—the same being but one small spot of the one hundred square miles of area of said district—yet they find fault with the inspector, wondering why he does not attend to the matter complained of, real or imaginary, whether he has control over it or not, and whether he knows anything about the same or not, and heap all kinds of epithets upon him, just the same as if he were endowed with the power of knowing when and where everything was wrong or right in each place in the whole district, at one and the same time, instead of first acquainting him of the cause of their complaint.

As I before intimated, the men very frequently blame him, the inspector, for not attending to many things that do not belong to his duty to do at all; such as, how long hours that the men should be required to labor in various places, out of the usual routine of work performed; because that their clothing is stolen from their wash-house erected near the mine; because they do not get an empty carriage to ascend the shaft or slope, whenever a number of them reach there during the day; because that in some place they do not get pay for driving cross-cuts through pillars; because they do not get cross-cuts at certain distances, and because the mine officers do not give them as much measurement for narrow work, such as air-ways and cross-cuts, as they claim they are entitled to; because a few places, *that are badly managed*, are in the habit of requiring the chambers to be gouged, first to the right, then to the left, to decrease the size of the pillar where a cross-cut is to be driven, to shorten the same; and that *no pay* is given to the miner for such work. Such work, I say right here, is evidence of bad and reckless mining, and is behind the present age of mining, and may be the cause of loss of lives and result in heavy litigation, &c.

The above, and many other matters, are subjects of complaints and abuse, over which an inspector has no control. These complaints may be ever so true, yet, he has no power in the matter, and they themselves ought to regulate them between their employers and themselves.

I have been always ready and willing to attend to anything that was within my calling, when properly notified or informed of the same, but did not do so very cheerfully, when notified through a communication of the character and style of the one I here give verbatim, as a sample of that class of literature received by an inspector.

In examining the Hutchinson colliery referred to, I found sufficient cause for complaint, and requested and stopped all the chambers in the lower seam, for want of sufficient ventilation, being that section where I found deficient. In a day or two afterwards a committee of two of the workmen, working in the said section, called upon me and begged of me to let them work on in the section that I had stopped, for a time, and that they would run their own risk. They acknowledged that the place was not a fit place to work in, for their health, but that it would be worse upon them and their families if I insisted upon keeping the place stopped. They said it was not a question of their own health, but a question of bread for themselves and families. After such strong appeals, I informed them that they had an organization belonging to the said colliery, of which they were all members; that if they would lay this matter before their meeting, and bring, or send me a communication, properly attested by its officers, expressing a desire, upon their part, of my withdrawing the said restrictions, that I would then consider the matter, but not before that could I do so.

The next day or so a communication was sent to me, with the request above referred to, signed by the officers of the said association, to which I replied that I could not give them the specified time of ninety days, but would leave the matter open for the time being, by letting them work on.

I read the letter above given, to the said committee, and they said it had been sent by an individual that did not then work in the mines, and offered to give me his name. I objected, not deeming it worth knowing.

They insisted, however, in giving his name, and stated that he was not living upon his own earnings, but upon the savings of others, having married a widow woman with a little money, in the vicinity of those collieries.

Operators' Complaints.

It is true that inspectors seldom receive letters of complaints or abuse from operators. They do, however, enter strongly worded protests against what they call the *dictations* of the inspector, in many ways and on many occasions.

They have a good many ways of making their displeasure known, and, often it is known rather against their will, as it crops out almost unknown to them.

I was once assailed vigorously, by one of them accusing me of interfering between him and his workmen. Not being guilty, I, as a matter of course, at once repelled the slander, and the individual subsequently acknowledged he had been mistaken. Frequently an inspector that dares do his duty, is charged by the operators of being biased and prejudiced against them and their whole interest, by favoring the workmen too much in various ways. On one occasion the writer, when having a case in court against one of them, relating to second opening, was accused in open court of persecuting the said concern, as their counsel stated, "because their mine was a black-leg operation," meaning a place being operated by persons

Kingston

Mr J C Williams-

Dear Sir we Take the Pleasure
to inform hof our Boos
and that Tom Jones of
The East Boston Mines the
ex Made A New law we will
inform You what it is Thare
and All through Luzerne Co
Have Attendid to Right & A way
it is a Shame to Think of
it he as stopt The Miners to
Go up the Shaft rented the
Labors so Sum it Seems that
Tom Jones can do As he like
W C Payne hont giv us 50
Nor A hundred Dolurs to Keep
A way No Nor Five Cts
All we Ask is our rights
and No More to See Men rush
ing for the Curage its To

Shame Some Wet through
to the Skin and half frosed
thare two or three Comts in the East
Boston Mines Aught to looked
After its one & of 3 Cars we

do get and half of that Taken
a way from us we are Not
Working By the day its By the
Car if we drive 8 yards
we get Six And if we drive
Six we get 9 that is our
Ways And Books will
Prove Jone its Dalf Thomas
Tom Jones is Not Jit to
Be a Boss But he is a
good Thef there is onely
three ore Fore men getting
Paid for theyes yardage in
the Shaft But as fore working
According to Ventelation we
are Not Neur it its far a
way from us

Yours Truly
D. H. Williams

You Dont do right your
Dalf And you Knowit what
did you do With Dan Coalmen
When he came after you you
got in discharged from the
work if you did tend to your
Bianess you Should Stopt
Such Bianess as that you
do wont Each and Every Man

When we do that we will get
our discharge in full when a
man do Sand Fore you we think
it your Place to do so Not get
a Fore man his discharge a
Nuther dont let Tom Jones
thing
Pull you a way Before you
Le what is there Be cous
he Will if you dont mined
it is full time to look after
There is Jem 250 to Three hundred
Men and Boys At the foot
of Shaft Waiting fore the carage
and No room fore them to Put Nore
Mind if Eny Man ore Boy is Killed
Who is to Blame We Know and
Will Show it So if Eny thing
Should Apen there is some
of us Men as will Let two miles
But By the time We are up
the Shaft we are Dosed Nous

Mr Williams Tom Jones dont
Cum to Se us only Once a Month
that is the last day of the Month
if a Minor is Not able to tend his

Never Has But he wonts to Keep
the mines down to get his ame up
Thare is Several things here that Hent
going according to Revelation the
Company will Don't Be rich we wont
the carpage Fare & Pay fore yardage
Respectfuely yours Miners all of us

Mr Williams Sent
Take Eny thing heard What
We Say to you Be cous we
Node it all Just we do say
do if you Can Please Send
to it We are Not dogs if They
Cant get a Nought of coal
Mr. w. half a day Let them
Take the after Noon Jone it
as we do, Pay All hands

Slatepickers and
Company Men Jave Six
and Eight Cars will Pay
All hands: and if we are Bound
to do one of them We would Jones
do it then Have But to Pay them
And May down the Shaft it is not
Right Now we will Not do
It Eather Very Fairly

not in the Miners' Union and styled by members of the union as blacklegs. This their own officers stoutly denied as being the case, so far as their employés were concerned.

In fact, an inspector that will do his duty in the premises is continually a target for both sides.

Printing and Distribution of the Mining Law Among the Workmen.

Many of our people, employers and employed, plead ignorance of the provisions and requirements of the mining law, whenever a case is brought against them for having violated the same, or failed to comply with its requirements.

That there is not that familiarity that ought to be with the requirements of the law among the operators and operatives, I am fully convinced; much of this ignorance, however, is the effect of their own indifference to acquaint themselves in the premises, yet it must be admitted that this state of things will prevail, to a great extent, until we have some better way of having those people posted upon this important subject. In other great mining countries, especially England and Wales, the law is printed in large type on posters, and posted up in a conspicuous place near the head of each mine. It is also printed in smaller type and placed in by-law book form, to be conveniently carried in the pocket. Each workman is required to be furnished with a copy of the said law. He is charged a small sum for the same, and in case of his leaving his employer's service, he receives credit for the same if he wishes to return it in good order. It is further required that the law be read to the workmen at stated periods, as many there are unable to understand the English language or read the same.

If it is necessary that all this be done in those countries where the law has been in force twenty and thirty years in advance of ours, then we certainly need not be surprised to find that we cannot get along without something that will produce the same results.

There are some objections to the State authorities doing this duty; that is to furnish the law printed in the various forms, as it will cost much more to have the same amount of printing done, and there would, in all probability, be required again as many copies of the same. In addition to the above, it would require a great deal of labor to keep these posters up, as they could not well be protected in this way. And again, it would require an endless supply of the books, as there would be no particular care taken of them. The workmen would demand them, just as they thought proper, and the employer would not trouble himself, except to furnish them so long as they lasted, and, perhaps, report their exhaustion to the proper authority. Besides that, often the parties furnishing or forwarding these copies of the law, would be used as a shield for the operator and operatives in case of their being deficient of them. Whereas, if the operators themselves were required to furnish these documents, they could charge the price of the said book to the recipient thereof, and when he returned it give the said person credit for the same, and, should the

same person call for a second copy, it also, would be charged to him. This would be a check against carelessness in taking care of these printed pamphlets.

In view of this state of things, I am of the opinion that the law, in the forms referred to, should be furnished by the operators, just the same as is required by the *English law.*

General and Special Rules.

The mining law of England, and of most other great mining countries, require that general and special rules be posted up at each colliery. This is also a requirement which they have found necessary from many years of actual experience, and our experience here, proves the necessity of a similar provision. Whenever any amendment will be made, in our present mining law, this matter ought to be one of its new features, as it is much needed. This amendment is certain to be adopted, sooner or later, and I think that the sooner it is done the better it will be for all concerned, and there can be no valid objection to such an amendment.

Coal Production for 1877.

Coal returned as having been sent to market, 3,836,164 tons; coal returned as having been consumed at mines and sold as local sales, equal to 103,107 tons in a production of 1,579,127 tons; coal estimated as consumed with the balance of production at the same rate as returned above, 141,056 tons, equal to six per cent. of the said production; total quantity of coal mined in tons of 2,240 pounds during the year, equals 4,080,327 tons.

Number of Persons employed in the Wilkes Barre District, about the mines, in 1877, inside and outside.

	Miners.	Inside men.	Outside men.	Totals.
Number of actual miners employed,	3,212			
Number of all men employed,		7,852	2,129	9,981
Number of all boys employed,		1,514	2,578	4,092
Total employees,		9,366	4,707	14,073

Casualties, Widows and Orphans.

Number of lives lost during the year,	38
Number of persons seriously injured,	121
Total,	159
Widows,	22
Orphans,	65

Summaries for 1877.

Tons of coal mined per life lost during the year,	107,377
Total number of days worked by the whole employés,	1,905,114
Average number of days worked per employé, equals	135.82
Average number of tons of coal produced per employé,	289.88
Average number of tons of coal produced per miner,	1,581

Total number of mules and horses in use,	1,315
Total number of steam boilers in use,	610

Machinery about the same as reported last year.

TABLE No. 1.—Showing number of Fatal Accidents, and classified, both monthly and daily, in the Wilkes Barre District, for 1877.

1877.	REMARKS.	By explosion of gas.	By falls of roof and sides.	By falling into shafts.	By mine cars.	By blasting powder.	Under ground miscellaneous.	On surface.	Total lives lost.
January,							1		1
February,							1		1
March,			7		1				8
April,			5	1					6
May,			12						12
June,									
July,			1				1		2
August,	Mining suspended,								
September,	Mining suspended,								
October,			2				1	1	4
November,			3	1		1	1	1	7
December,		1	3				1		5
Totals,		1	25	2	1	1	6	2	38

DATE.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Totals.	By explosion of gas.	By falls of roof and sides.	By falling into shafts.	By mine cars.	By blasting powder.	Under ground miscellaneous.	On surface.	Total lives lost.
1,			1										1		1						1
2,		1											1						1		1
3,												1	1		1						1
4,				1						1			2		1				1		2
5,			1									1	2		2						2
6,																					
7,			2										2		2						2
8,											1		1		1						1
9,																					
10,																					
11,																					
12,																					
13,																					
14,						1							1		1						1
15,							1				2		3		2				1		3
16,											1		1							1	1
17,	1			1									2			1			1		2
18,										1			1		1						1
19,											1		1					1			1
20,				1									1		1						1
21,						1	1						2		2						2
22,																					
23,					1								1		1						1
24,												1	1						1		1
25,							1						1						1		1
26,																					
27,			1								1		2		1	1					2
28,			1	3							1	1	6	1	5						6
29,			1							1			2		1					1	2
30,																					
31,			1							1		1	3		2		1				3
Totals,	1	1	8	6	2	2	2			4	7	5	38	1	25	2	1	1	6	2	38

TABLE No. 2.—Showing the number of Persons killed in the Middle District of Luzerne and Carbon Counties, from 1873 to 1877, both inclusive; also under what head or title accident occurred, together with the percentage of each item of the whole number for said term of five years.

	1873.	1874.	1875.	1876.	1877.	Totals	Percentages.
Explosion of Carbureted Hydrogen Gas.							
Explosion of carbureted hydrogen gas,	6	9	6	7	1	29	11.20
Falls of Roof and Sides.							
Falls of coal and bone,	9	14	13	14	16	66	25.48
Falls of rock and slate,	2	3	5	9	9	28	10.81
Sundries,	...	...	1	...	...	1	.39
Total falls,	11	17	19	23	25	95	36.68
In Shafts.							
Falling into shafts from top,	3	3	12	...	1	19	7.34
Things falling from top.							
Falling from part way down,	....	..	2	1	1	4	1.54
Things falling from part way down.							
Sundries in shafts.							
Total in shafts,	3	3	14	1	2	23	8.88
By Mine Cars.							
By mine cars,	13	9	5	4	1	32	12.35
By Explosion of Blasting Powder.							
By explosion of blasting powder,	...	1	2	3	1	7	2.70
Miscellaneous Under Ground.							
By blasts in coal and rock,	4	4	8	10	3	29	11.20
By locomotive engines,	...	...	...	1	..	1	.39
Sundries under ground,	...	7	1	3	3	14	5.40
Total miscellaneous under ground,	4	11	9	14	6	44	16.99
Total under ground,	37	50	55	52	36	230	88.80
On Surface.							
By machinery,	...	1	2	1	...	4	1.54
Suffocated in chutes of coal breakers,	...	1	2	...	...	3	1.16
Crushed by cars,	6	1	2	2	2	13	5.02
Crushed by locomotives,	...	...	2	...	...	2	.78
Sundries on surface,	3	4	...	...	...	7	2.70
Total on surface,	9	7	8	3	2	29	11.20
Gross totals,	46	57	63	55	38	259	100.00

MAP

SHOWING LOCATION

OF

EXPLOSION AT No. 7 SHAFT

Dec. 28th 1877

Scale 100 Feet to One Inch

J.M WILLIAMS

Inspector of Mines

TABLE No. 3.—Exhibits a summary of Fatalities; also the Coal production in tons per life lost in this, the Wilkes Barre District, for the years 1873-4-5-6-7, classified under five heads.

	Explosion of carbureted hydrogen gas.	Falls of roof and sides.	In shaft.	By mine cars.	By blasting powder.	Miscellaneous.	Above ground.	Totals.	Tons of coal mined per life lost during 1873-4-5-6-7.	Total production in this district during 1873-4-5-6-7.
1873,	6	11	3	13	. . .	4	9	46	92,000	4,232,000
1874,	9	17	3	9	1	11	7	57	80,000	4,513,837
1875,	6	19	14	5	2	9	8	63	67,629	4,261,263
1876,	7	23	1	4	3	14	3	55	83,916	4,615,386
1877,	1	25	2	1	1	6	2	38	107,377	4,080,327
Total of lives lost, . . .	29	95	23	32	7	44	29	259	*86,184	21,702,813
Percentage of each item of the whole list, . . .	11.20	36.68	8.88	12.35	2.70	16.99	11.20	100		

* Average.

TABLE No. 4.—Summary of the items of Production, number of Persons employed and of lives lost; together with the relation of those items to each other, for the years 1873-4-5-6-7, in the Wilkes Barre District.

	1873.	1874.	1875.	1876.	1877.	Totals.
Coal produced per year in tons, ...	4,232,000	4,513,837	4,261,263	4,615,386	4,080,327	21,702,813
Number of persons employed each year, .	11,325	13,576	15,000	14,317	14,073	
Ratio of coal production, in tons, to each employee, ...	372.6	332.5	284.0	323.0	289.88	*320.39
Number of lives lost each year respectively,	46	57	63	55	38	*51.8
Ratio of coal production, in tons, per life lost, ...	92,000	80,000	67,629	83,916	107,377	*86,184
Ratio of persons employed per life lost, . .	246.84	238.17	238.22	260.5	270.34	*254.81

* Average.

Fatal Accidents by Explosion of Gas.

Accident No. 35.—A youth of 18 years, named Stephen Tredinnick, working in the Audenreid colliery as door attendant, on the 28th day of December, was so seriously injured by explosion of gas, being thereby burned severely and subsequently exposed to the strong currents of air in the mines, as well as being conveyed to his home, that he died of his injuries the following day.

This was the only fatal case in this district, from explosion of gas, during the year.

The real cause of the accident is to me a mystery, but it is very evident that the current of air passing through the place where this misfortune took place, must have been reduced by some means for a short time prior to the explosion.

A miner named Levi Gibbons and three laborers were driving a piece of a gangway (see plan) to connect to a section driven from another direction, from new tunnel A, which had just been cut through in the lower bench, or tier, worked by them at B. The place was generating a considerable quantity of gas at all times, and was being ventilated by means of

a canvas door placed on a counter gangway, marked C, about seventy feet lower down on the pitch, to force the air up into this place, being conducted up and along said short piece of gangway, a distance, altogether, of about two hundred feet, by a wooden brattice. The boy Tredinnick was attending to the canvas door above mentioned, and had no other duty to attend to. After that the connection above referred to had been effected, the air would take a shorter route than heretofore by passing through the new connection; but at this time the passage had not been broken through in full size, hence only a part of the current could go through said opening. If that the canvas door before referred to should have been neglected, from an erroneous idea that the new connection had been made, and that it would allow sufficient air to pass through independent of the action or position of the said canvas door, then the result could be accounted for. One of the laborers stated to me that he did not think that the canvas door had been kept closed as carefully, after that the connection referred to had been made, as it had prior to that time. I also learned that the boy had been assisting the miner Gibbons to carry the large wooden box, in which they kept powder, oil, &c., up from his canvas door to a point in the gangway of Gibbons, and subsequently went back and got some spikes used to fasten the T iron rails for track with, and this time he entered the place by going in in rear of the wooden brattice and passed around the inside end of the same, and when he reached the point where he left Gibbon, he stated "that the bosses were at the face of the gangway," and he immediately ran towards his canvas door location. The bosses referred to by the boy were Messrs. John T. Griffith, general foreman of all the company's mines, Lewis S. Jones, mining boss at the Empire mine, (the adjoining colliery,) and Richard Roderick, mine boss in this colliery.

About this time those officers passed onward by the miner Gibbons, and were in the following order: Near Mr. Gibbons was Roderick, and a few yards in advance of him was Jones, and a few yards still further ahead was Mr. Griffiths, being near the head of the cross-hole, marked C, about sixty (60) or seventy (70) feet from the canvas doors, when an explosion of gas took place, whereby the three bosses and the boy Tredinnick were severely burned, and three laborers working for the miner Gibbons, in the face, one hundred and forty feet from where Griffiths was, were slightly burned on their faces and hands. The miner Gibbons was scarcely touched by it, only having had his nose and the back of one hand slightly singed. As before stated, the boy received fatal injuries, while Griffiths was very seriously burned on head, neck, face, and hands, his condition being critical. Jones was also burned on head, neck, face, and hands severely—one hand very much so. His health otherwise failing him, he was very seriously ill for some time. Roderick was more fortunate, his case being light in comparison to the other three aforementioned.

Those officers, as others there and then working, had naked lamps; but

the officers had theirs in their hands, as they were the lamps with long handles, not adapted to be used on the head, and mostly in use by mine officers; while the miner and his laborers, before referred to, had their lamps upon their heads, the miner, (Gibbons,) having been standing with his lamp on his head but a short time previous to this time, in the same place.

The height of the passage from the elbow, where Griffiths was, until within a few feet to where they had cut through in the face, was only about six or six and a half feet, and width, about twelve feet. Immediately where they broke through, they had not cut down the top coal. Neither had it been taken down in the narrow passage, from the canvas doors up to where Griffiths was when the gas exploded. I have not been able to learn who it was that ignited the gas, with his lamp, or, in other words, have not been able to make out from which person's lamp the gas did ignite. Yet this is only a minor matter, the important question being, how came the gas to accumulate in the said place at this particular time? And this, to me, is also unknown. Although I have done all I could to learn. I am free to confess that I cannot see that any carelessness could be traced in the matter, so far as I was able to learn, unless it was in exercising less vigilance over the canvas doors after that the connection had been made, and this even is not very strongly proven, although hinted at. As before stated, there was but one fatal case from explosion of carbureted hydrogen gas out of the thirty-eight (38) lives lost during the year—equal to two and sixty-three hundred (2.63) per cent. of the whole number. In 1876, there were fifty-five (55) lives lost, out of which seven were lost by explosion of gas—equal to twelve and seventy-two hundred (12.72) per cent. Taking an average of the years 1872–3–4–5–6, and we find, that out of the total number of fatal accidents reported, thirteen and seventy-nine hundred per cent. (13.79) were from explosion of gas, directly or indirectly. Therefore, our accidents having been reduced from sixty-three lives lost in 1875, fifty-five in 1876, and thirty-eight in 1877; and from seven lives lost, by explosion of gas, in 1876, to only one in 1877, we certainly have cause of congratulating ourselves and other persons interested in the cause of common humanity, upon this great improvement. I am firmly convinced, that with increased vigilance, this improvement can be maintained, and our death-roll, in connection with mining, be considerably less than in years gone by, provided that proper discipline will be enforced in each department.

Falls of Roof and Sides.

There were twenty-five lives lost in 1877, from fall of roof, &c.=65.78 per cent. of all the accidents that occurred during the year, being 38.

In 1876, out of 55 lives lost, twenty-three (23) were lost by falls of roof and sides, a percentage of 41.82, and for the five years preceding 1876, thirty-two and eighteen hundred per cent., (32.18.) The number this year is two greater than in 1876; but the total number of lives lost is seventeen

(17) less than in 1876, hence the great difference in the percentage of this item over and above that of 1876.

ACCIDENT No. 3.—A miner named Nathaniel Griffiths, working in the Diamond shaft mine, was so seriously injured on the head and face, by the falling of a piece of coal from the face of his chamber, that his injuries proved fatal the next day. The coal that fell had been partially loosened by a blast prior to its falling. Mr. Griffiths was a miner of many years' experience, having filled the position of a mine foreman for a length of time in times gone by. He was also considered a very careful miner, hence it is safe to say that in this case at least the accident was not the result of lack of skill or care on the part of the victim or any one else.

ACCIDENT No. 4.—A miner named Patrick Maycock, working in the Prospect shaft colliery, on the fifth day of March, was instantly killed by the falling upon him of a piece of rider coal, while working in a cross-cut. The mine boss stated after the accident had occurred, that he had been warned twice by him, to timber the place, to prevent this rider coal from falling upon him as it did.

ACCIDENT No. 5.—Two miners named respectively John Donahue and Merrick Johns, working in No. 1 tunnel, Nanticoke, were killed by a large piece of rock falling upon them. They had a third man working with them, whose life was, fortunately, saved; he happening to be a short distance away in search of an ax at the time the stone fell, although he had been there but a moment before that.

It appeared on investigation, that those men were in the act of standing a prop, and finding it a trifle too long, took it down, ordered the laborer to go and get their ax, that they might cut the prop shorter; in the twinkling of an eye, afterwards, the two men were crushed to death by the fallen rock.

ACCIDENT No. 6.—Ellis Ward, a driver boy, of the age of sixteen years, working in the No. 3 slope, Wanamie, on the 27th day of March, was struck down, by a piece of coal falling upon him, killing him instantly, while he was in the act of driving a mule by, with an empty car along the main gangway. The piece flew or spalled from the side, being forced by the pressure of the rider coal overlying the same, which was working. The boss stated that he had just passed by, and had not observed anything unusual, or any sign of working in the said coal.

ACCIDENT No. 7.—Daniel Learch, a miner, working in the Washington colliery, on the 28th day of March, was so dangerously injured by fall of coal, that he died of the effects of said injuries the next day. He was working at robbing back pillars, the most dangerous work a coal miner is required to do. He had been doing so for some time; had been selected to do so, because he had been considered a skillful and careful miner. On the fatal morning, he had scarcely reached or touched the face of his work, when the coal rushed upon him in large quantities, requiring much time

and skill to get him out alive, which was done; yet it cost his life, in a short time.

Accident No. 8.—A miner, named Francis Dougher, working in the Forty Fort colliery, on the 29th day of March, was so dangerously hurt by a piece of thin rock falling upon him, that he expired in a few hours, the same day. The piece that fell was only two or three inches in thickness, and Dougher and his partner had made some attempt at taking it down; but finding it rather fast, they left it alone, and began to take up a piece of bottom coal—a small bench next to the floor—when suddenly it gave way and fell, with the result above stated.

Accident No. 10.—A laborer, named Peter Washington, was killed by a piece of slate, from roof, falling upon him, while at his work, in a chamber, in the Empire shaft, April the 4th. In this case, it would appear that the case was accidental, there being a slip in the said roof, out of sight, in the pillar.

Accident No. 12.—Patrick Quinn, a miner, working in Empire Shaft colliery, on the 20th day of April, was so seriously hurt by a fall of bone-coal, from roof, that he died before reaching the surface. The mine was not being operated this day, but Quinn and his laborer went in to do some work, preparatory for the time that work would be resumed, and there were but a few persons in the mine at the time of the accident. The laborer was so severely injured, the same time and place—besides having lost their lights, both of them—that he labored hard to travel, in the dark, on his hands and knees, to the foot of the slope, having left his miner, Quinn, in as comfortable a position as he could, at about eleven, A. M., and reaching the slope foot about six, P. M., where he met some other persons, whom placed him on a truck, and pushed it into the mine, to rescue poor Quinn. They found him in a very exhausted condition, from his severe injuries and great exposure for so many hours, and before they could get him to the surface, he expired. The laborer, (John Mooney,) must have suffered intense pains during these many hours, while endeavoring to seek assistance for himself and his dying comrade.

Accident No. 13.—A laborer, named James Ellis, working in the Exeter colliery, West Pittston, on the 28th of April, was so dangerously hurt, from a piece of slate from the roof—called by the miners, "black rock," a kind of fire-clay, and very treacherous, falling without giving any warning; hence not to be trusted—that he died shortly afterward. The miner, a Swede, named Johnson, stated that he had notified the laborer not to go under the piece that fell, as he knew it to be dangerous; but that he did go there, subsequently, to put back some loose coals, when suddenly it fell, with the above results. This case is not a very clear case, one way or the other, and looks rather dark, as, I think, the miner, knowing the rock to be dangerous, ought to have seen to it, that the laborer did not go under it.

Accident No. 14.—Two men, named Martin Cauley, a miner, and Pat-

rick Skiverton, his laborer, working in the Laurel Run colliery, on the 28th of April, were both killed by a large piece of rider coal falling upon them. This case can scarcely be considered an accident, as it occurred through pure carelessness on the part of the miner, Cauley. The miner working in the adjoining place, called Cauley's attention to the fact, that the said bone coal was dangerous, and advised him to timber it immediately, and Cauley rather made light of the suggestion, and after its being repeated he said he had a hole drilled in it, and would blast it down; after that he would fire another blast in the coal below it. His neighbor had scarcely reached his working place, when he heard the crash of the fall, and behold, the rider coal had fallen killing Cauley and his laborer.

ACCIDENT No. 15.—Randall Cooper, a miner, working in No. 2 colliery, D. and H. Canal Company, on the 14th of May, was killed by a piece of coal falling upon him while in the act of working out coal previously loosened, to some extent, by a blast. This undoubtedly was caused through an error of judgment on his part, of the condition of the coal overlying the bench he was mining out.

ACCIDENT No. 16.—Dennis Leary, a miner's laborer, working in the Hutchison colliery, on the 23d day of May, was instantly killed by a thin piece of rock falling upon him. The piece that fell was about eight or nine feet long, four feet wide, and two and a half inches thick. It appeared that the miner was standing close to him drilling a hole at the time, and that some slight effort had been made by him to pull the piece down; yet it is hardly possible to think, that it could not have been taken down had a proper effort been made to do so, and, at all events, it would have been an easy matter to have put a temporary prop under it, until such time that they were ready to try it again. I do not think this case should have occurred with proper skill, and that vigilance, required in mining.

ACCIDENT No. 17.—Jackson Ide, a miner's laborer, working in the Wyoming shaft, on the 15th day of June, was killed by a fall of rider coal from roof. The unfortunate man had never been in a coal mine for the purpose of working until the morning of the fatal day, and had only been in about one half hour prior to his terrible fate. The bosses, McCulloch and Jones, and the miners, were of the opinion that the case was purely accidental. I did not see it quite so accidental, and so stated. There were slips in the roof running nearly parallel with the rib, and about twenty feet from the face, the inside prop was stood, close to which another slip set in, in the roof running nearly at right angles to the other slips aforementioned. The other slips were not quite parallel, being nearer together at the face of the chamber, hence the piece from the cross slip to the face between two others had little or no support; and it is only very strange that two experienced miners should not have been able to have discovered this fact in time. It would probably have been hard to convict any per-

son in this case; yet I must say that with a proper system of inspection and scrutiny on the part of the officials, and ordinary skill and care on the part of the miners, this case ought never to have occured.

It was in the face of this occurrence, that I made up mind to henceforth hold the mine officers responsible for *any* and *every such* an accident, where every care and caution had not been exercised, by bringing the matter before the courts, and so notified mine officers as I went from mine to mine in the district.

Accident No. 18.—John Mullen, a miners' laborer working in the Empire shaft, on the 21st day of June, was instantly killed by a fall of coal. The coal that fell upon him was resting on a prop close to where he was working breaking coal ready to load his car, and it was thought that a rush of large lumps of loose coal started and struck the said prop, and which was thereby knocked out of place, when the coal immediately fell with the above result. The said prop could not have been so struck out had the bottom end of the said prop been properly fastened, *i. e.*, had it a sufficient hole in the bottom slate to hold a blow or hard shock. The miner in this case, however, was not responsible for this deficiency, as the timbering had been done by company hands many months before this time, and some of the said workmen had left the place. This again shows the importance of doing things in a workmanlike manner, and that the lives of others than those engaged in the work at the time are frequently dependent upon the character of the said work, at subsequent periods, when the same cannot easily be examined. It might be possible that the loss of this man's life ought to be placed as the result of incompetency or carelessness on the part of some one of the company hands having the standing of the said props in charge at the time it was done.

Accident No. 19.—Daniel Heffren, a miners' laborer, working in No. 2 shaft, Waterman & Beaver, on the 21st day of July, was killed by a fall of slate from roof. This case, again, is rather a dark one, as the condition of the place just before the occurrence could not have been considered very safe, as the laborer had raised objections to loading in under the slate that fell, when the miner told him to go and drill the hole in his place, and that he would load the car. The laborer, at this challenge, said if it was safe for him (the miner) that it was as much so for himself, and worked on a short time, when down it came. The mine boss stated that he knew of no unusual danger there, but I learned subsequently that he had warned the miner to take care of the said piece of roof. Hence, I say, this case does *not* look, as purely accidental.

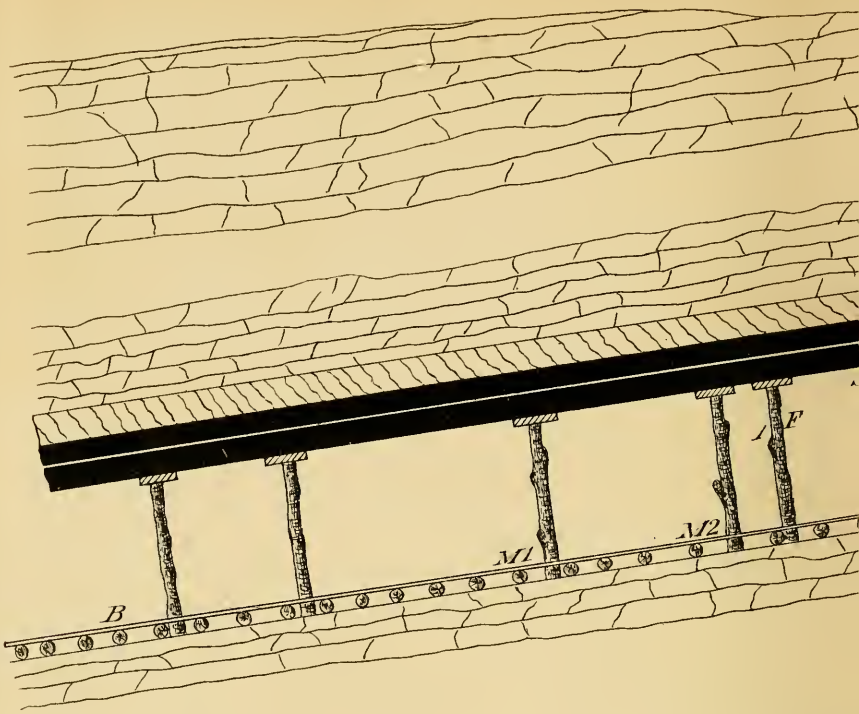
Accident No. 22.—Nicholas Snyder, a miners' laborer, working in No. 4 slope, Nanticoke, on the 18th day of October, was almost instantly killed by a fall of rider coal in a gangway where he had just reached, not having yet begun his labors of the day; and that was his first and last day in the said mine.

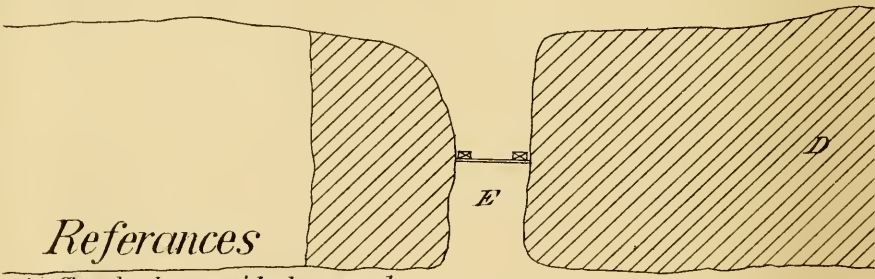
The regular miner was not in the mines this day, being sick, and another man took his place. There was nothing indicating carelessness in this, to my mind, although it is possible that had there been more skill and experience possessed by the miner or laborer, the case might have been different; yet this case is nearer to have been an accident than many that are so called in our mining catastrophes.

ACCIDENT No. 24.—A miner, named Michael Burk, working in the Forty Fort colliery, was instantly killed by a fall of rock, from roof. The accident occurred near the inside cross-cut, between gangway and air-way. The man Burk had just been to the face of the gangway, and was returning to his own place—the parallel air-way—when the said roof fell on him. The party were working on night shift. In this case, the men that worked in and around the place, all agreed that the said place did appear quite safe, and stated that five or six persons had just been sitting under the same, a few hours before that. The stone was somewhat of a fire-clay nature, and had a circular-smooth, running to a feather edge, on one side, and on the rib side, there was a vertical-smooth or break, running parallel with the rib; hence it had no support. Immediately across from the said cross-cut, a chamber was being opened, which added somewhat to the weakness of the roof, at this point.

ACCIDENT No. 25.—Patrick Moyles, a miners' laborer, working in the Audenreid colliery, on the 8th day of November, was instantly killed by a fall of coal. So suddenly did the coal fall, that several other persons, including Moyles' miner, near by, never heard any warning; and he was sitting innocently under said coal, resting himself, when it fell upon and crushed him to death. The coal at this point was strong, but had very kind slips running through, and a large piece of one of these, it was that gave way so suddenly. The place was well timbered. In fact, it was a more dangerous place than they had any idea of, from those slips, and no negligence could be traced in this case.

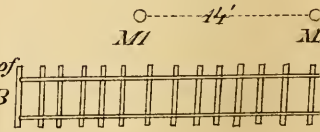
ACCIDENT No. 27.—Richard Coon, a miners' laborer, working in the No. 1 shaft, Waterman & Beaver, near Kingston, on the 14th day of November, was so dangerously injured by fall of rider coal, from roof, that he died of his wounds the next day. This, again, was one of those unfortunate cases, that should not be called an accidental occurrence. The report stated that the miner in charge of the working place had been notified to timber the roof, and that, neglecting to do so, the same fell, causing the fatal injury of the laborer, (Coon.) In making a personal examination of the place, and the whole circumstances connected therewith, I came to the conclusion that the aforesaid charge against the miner was a correct one. I also became just as satisfied, in my mind, that there was blame attached to the officer in charge of said mine, in not seeing that timbering had been done in this place sooner—*i. e.*, prior to the time of the fatal injury of the man, (Coons.) I examined the place, in company with the mine-boss, a

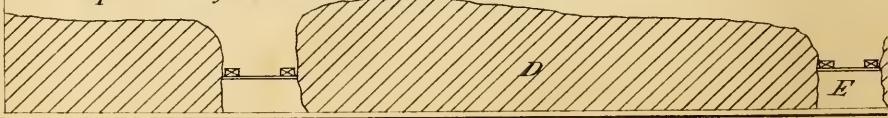


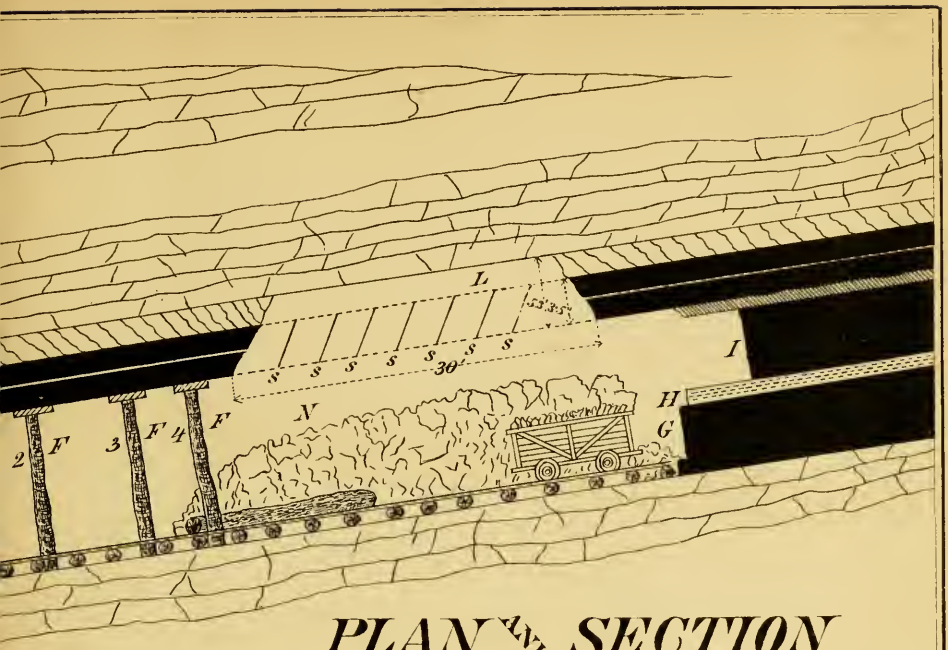


Referances

A = Chamb where accident occurred
B Rail Road or car track
C Mine car
D Pillars left to support the roof
E Cross-cuts thrvagh pillars
F Props erected since the accident
G Checker or bottom bench of coal
H Bone coal in seam of coal
I Mining bench of coal
J Dividing slate
K Two benches of top coal
L Slate or fire-clay over coal
M Props erected by the miner before caving of roof
N Top coal and slate fallen on Laborer
P Place where Laborer Coon was found
R Miner Langans' position
S Slips crossing chamber and pillar ends in view







PLAN AND SECTION

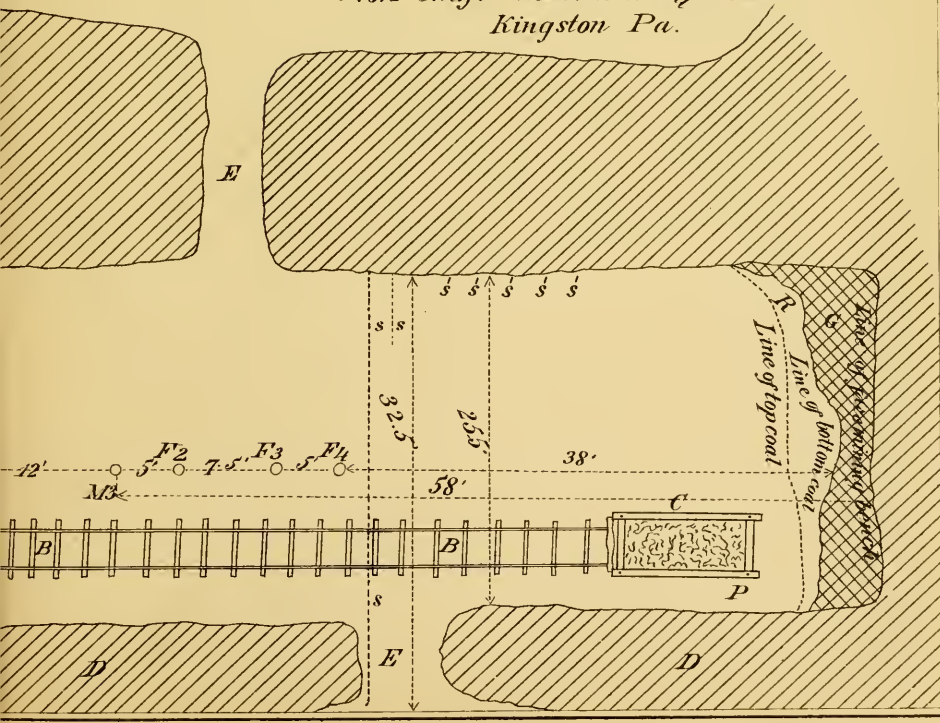
of

Chamber where Richd Coon lost his life

Novr. 14th 1877.

No.1 Shaft Waterman and Beaver

Kingston Pa.



Scale 15 feet = 1 inch.

J.M.Williams Inspector of mines.

second time; and after making a thorough examination, taking measurements of height, width, and length of the place, distance between timber, and from the inside prop to the face, where the occurrence took place, I was more than ever convinced of the fact, that the mine-boss ought to have insisted upon more timbering having been done there.

After mature deliberation, I entered complaints against the miner, (Patrick Langan,) and the mine-boss, (Daniel R. Davis,) before Alderman Parsons, and had them bound over to the higher court. In December, the case came before the grand jury, when true bills were found against both, and the cases were set for trial in January, 1878. In order to give persons reading this account, a more clear idea of this case, in its details, as the result of it may be of some importance to all persons connected with mining, under our present mining law, and its construction and execution, I have deemed it proper to give a diagram of the place, which gives two views of the chamber—one a simple plan, and the other a sectional view of the same.

The letters of references and the figures giving the distances between the props, and from inside prop, stood prior to falling of roof, to the face; as also the distance from prop stood subsequent to falling of roof coal, near the slip S, extending through the pillar and across the chamber, will enable any person to fully understand the circumstance in this case by the assistance of the following description of the same:

On the 13th day of November, the mine boss, Davis, in going through the miner's, Patrick Langan's place, observed the roof was giving symtoms of danger; there being slips in the top coal which was kept up for their immediate roof, and said slips were in view and opening apart considerable, and extending across the pillar and chamber. He then called the miner's attention and requested him to be sure and timber it. Davis had cautioned him on a previous occasion, to set some timber. On the last named day there were three or four props in the place to be put up at any time. About 4.30, P. M., the next day the top coal fell the width of the chamber, and for about thirty feet back from the face, to where the slip entered through the cross-cut. The miner stated that he had stood one prop and that it had since been knocked out from coals from a blast; he further claimed that he and the laborer were not able to stand the said prop. Now, it is very evident, that if there was any need of standing the said prop before blasting the shot, that caused it to be displaced; then certain it was, that there was need for it after said shot had excavated more ground, thereby exposing more roof; yet, Langan worked on until the fatal cave took place. The distance from the inside prop stood by the miner prior to the fall was fifty-eight (58) feet from the face, and between the same and the next outwards was twelve (12) feet, and from the second to the third, a distance of fourteen (14) feet; but as soon as the fall took place, these timber were stood, as can be seen by the diagram marked F, as near as four and a half and five feet apart up to the end of the top coal, where the slip let the other coal down. And further, there was but one slip in view

between the slip R and the mouth of the cross-cut, that I noticed, and yet there were timber stood as marked M under said good roof; whereas, from slip R to the face, some thirty-eight (38) feet, which had dangerous looking slips, and a weak pillar, near cross-cut, only seven and a half feet thick, there were no props. I had previously given notice to each mine boss in my district, that any case of this kind occurring, it would be my bounden duty to bring the matter before the court, by prosecuting the miner under section nineteen, and the boss under section eight, of the ventilation law.

I have become satisfied in my mind long ago, that fifty per cent. of the accidents from falls of roof and sides, could and should be avoided, and that fifty per cent. more timber used in our mines, when properly placed, would be the means of saving twenty-five per cent. of the class of accidents just referred to.

To any one who knows anything about proper timbering, it is proof evident in examining most of our mines that the mine bosses either do not know or understand that branch of mining, or they have very little pride in seeing things done in a proper and workmanlike manner, if it was only for the sake of the appearance of the same; but competent managers know that timber well stood, are worth two or three times as much as if improperly and carelessly stood.

A written description of these timber, how they have been stood in many of those mines, could not very well be made to convey a proper idea of the same. The only way a proper idea could be had is by either seeing them in the place, or otherwise have them drawn by an artist such as *Nast*. I think, however, that in a year or two more, much of this evil will be corrected. If it were a rule to pay for timber, much of the complaints here made would soon not be heard of, as the cause would be removed.

ACCIDENT No. 31.—Morgan D. Davis, a miner, working in Warrior Run colliery, on the 28th day of November, was so seriously injured by a piece of slate from roof falling upon him, that he died from said injuries the same night. He and his partner were in the act of timbering, and having found the prop a trifle long, were cutting it shorter, when the said piece fell, striking Davis and resulting as above stated.

ACCIDENT No. 32.—David T. Jones, a miner, working in the Avondale colliery, on the 3d day of December, was killed, instantly, by falling of a piece of coal upon him, while in the act of mining out a piece of coal previously loosened by a blast. Jones was evidently disappointed in the condition of the coal overlying the bench he was mining out, as a large piece flew over the said bench and caught him as he jumped back, as he supposed far enough to escape from the piece he was working at with his pick, with the above sad result.

ACCIDENT No. 33.—John Hughes, a miner, working in the Henry colliery, on the 5th day of December, was killed by a fall of a small piece of rider

coal upon him, while barring out some loose coal after a blast, much like accident No. 32.

There were inquests held in both cases, and verdicts of accidental deaths rendered in each.

Accident No. 36.—John Nicholson, a miner, working in the Enterprise colliery, on the 31st day of December, was instantly killed by a piece of coal falling upon him, while in the act of mining out coal loosened by a blast, much similar to accidents Nos. 32 and 33. An inquest was held in this case, and a verdict of accidental death rendered. Dr. J. B. Crawford, deputy coroner, acting as coroner.

In Shafts.

For the five preceding years this item was equal to 9.19 per cent., and this year equals 5.26 per cent.

Accident No. 11.—Levi Thomas, a carpenter by occupation, working in the Audenreid colliery, on the 17th day of April, was instantly killed by stepping into the open shaft at the ground landing, and falling to the bottom, a distance of nearly nine hundred feet, his body being terribly mangled by the fall, and lighting upon the canopy of the carriage.

Thomas had not long been out of the shaft and desired to descend again, that he might have a more definite understanding from the mine boss relating to some work he had been ordered to perform in the immediate future. He requested his laborer to attend to the signals. At this time he opened the gate, when himself and another man stepped inside the same, as it was supposed, to await the arrival of the empty carriage, but Thomas did not stop, but walked straight into the open shaft, with the aforementioned result. What caused him to have done so is a mystery, and I know of no way to account for it, unless it be that he was at that critical moment in a state of absent-mindedness, which all persons are liable to, although we may, fortunately, not be in such a critical situation as this man was at the time referred to.

Accident No. 30.—John Simmons, a miner working in the Conyngham shaft, on the 27th day of November, was instantly killed by falling in shaft a distance of about twenty-five feet. Simmons was considered a very trusty and competent man. He had charge of a gang of men in this shaft in putting and preparing place for pumping machinery, and in attempting to remove some few shelter-boards used to throw off the droppers, he unthinkingly stepped upon an inch board which had been cut nearly through to fit it around some pipes, which broke down and pitched him headlong into the opening below, and his being in the pumping shaft compartment, he came in contact with, and lodged upon, one of the stays holding the pipes, about twenty-five feet below, but his fall was sufficient to crush in the front part of the skull, causing instant death.

By Mine Cars.

During the five preceding years, this item averaged 14.56 per cent. of the whole list of accidents, and for this year it equals 2.63 per cent. This item is just the reverse of that of falls of roof and sides. In the latter, there has been a yearly increase from 1873 as follows: 1873, 11; 1874, 17; 1875, 19; 1876, 23, and in 1877, 25. But in this case it is quite different: 1873, 13; 1874, 9; 1875, 5; 1876, 4, and in 1877, 1. Hence, only one life was lost during the year.

ACCIDENT No. 9.—O. McLeary, a company laborer, attending head of plane in the Hartford, No. 3, slope, on the 31st day of March, was so seriously injured by being crushed between car and prop, that he soon died of his wounds.

It appeared that the car as it got over the apex, left the track, and the headman trying to either crowd it over to the track or to loosen the rope, was caught between it and the prop near the head, with the above result.

By Blasting Powder.

There was but one life lost by blasting powder, equal to a percentage of 2.63 of the whole number of lives lost during the year.

During the five preceding years, the average was 2.3 per cent. of the whole. In 1872, 0; 1873, 0; 1874, 1; 1875, 2; 1876, 3, and in 1877, 1.

ACCIDENT No. 29.—Lewis Price, a miner working in No. 5 colliery, D. and H. C. Co., Plymouth, November 19, was so severely injured by explosion of blasting powder, that he died on the 22d. He was, at the time, in the act of pouring powder out of a keg into a tin can, when a spark from a lamp on his head flew into the said tin, igniting the whole of the powder in the tin can and keg, with the above result. This is another victim to such folly and extreme recklessness in handling blasting powder.

I was in hopes to have been able to break up a large portion of the recklessness with powder, having paid more attention to the matter of safe handling, and keeping of powder out of the way of passers-by, and everything that I could think of, upon this subject, to add to the safety of the workmen, than any other single item except in the case of timbering.

Miscellaneous.

There were six lives lost under this head during the year last past, equal to 15.78 per cent. of the whole number of lives lost. During the five years preceding, the average was 16.00 per cent. In 1876, fourteen lives were lost under this head.

The sub-division of the above head into the following items: By blasts in coal and rock; by sundries, will give the following results:

There were three lives lost by blasts and three by sundries, while last year there were ten lives lost by blasts and four by sundries.

By Blasts.

Accident No. 1.—Hugh McGiven, a miner working in the Hartford colliery, on the 17th day of January, was killed by explosion of a blast.

It appeared that he had returned to re-touch a blast that he supposed had missed fire.

The laborer stated, that the miner was using the ordinary miners' straw of his own filling.

Accident No. 21.—Patrick Sullivan, a miner working in Wyoming colliery, on the 4th day of October, was killed by explosion of a blast in coal.

He and his laborer had touched the fuses to set off two blasts; in due time one exploded, and after waiting considerable time, the miner Sullivan went on to learn the reason of the second blast not exploding, as he had ignited them both. His partner advised him not to go on, but he said that they may have to wait all day, and went on, and just as he reached the face, the blast exploded, killing him instantly.

Accident No. 26.—William Offres, a miner working in No. 1 shaft, Nanticoke, on the 15th day of November, was so dangerously injured by explosion of a blast in coal, that he died the same night of his wounds.

His brother, who was laboring with him, stated, that the miner had cut off a piece of the match attached to the patent squib that he was using, and that he had scarcely turned from the hole after igniting to match, when the blast exploded with the above result.

Sundries.

Accident No. 2.—John Hartland, a mason, who had a contract for building foundation for engines in the Diamond colliery, inside of the mines, on the 14th day of February, was found dead on carriage at foot of the shaft.

Mr. Hartland was going down on the carriage on one side, and other persons were being hoisted on the other side the same time from the bottom. There being no coal hoisting, there was no person attending foot of the shaft; but the engineer, having occasion to hoist the carriage sometime after Hartland went down, the carriage was hoisted only a short distance when the engine proved at once that there was something wrong, and the engineer stopped. Soon afterwards, some person came to the shaft foot, and the body of Mr. Hartland was found to be fast between the carriage and the side of the shaft, and the signal being given, the carriage was let down, and it was discovered that the poor man was dead. It is impossible to state what caused the death of Mr. Hartland. It is claimed by the engineer and other men, such as those who came up on the opposite carriage, that Hartland had ample time to have got off and traveled quite a distance, from the time the carriage reached the bottom. Some people think that he must have had a spasm while alone on the carriage, some of his ances-

tors having died of such effects. Still there is no positive knowledge of the matter.

ACCIDENT No. 20.—Patrick Dougherty, a driver boy, aged seventeen years, working in the Empire shaft, on the 25th day of July, was found in an unconscious state of mind on the track not far from a mule that he was driving. He was so dangerously injured that he died the second day after the occurrence. It was supposed that he had been kicked by the mule, yet it is not positively known if he was so or not.

ACCIDENT No. 34.—Luke Turner, a driver boy, aged eighteen years, working in No. 1 shaft, Waterman & Beaver, Kingston, on the 24th of December, was instantly killed by loaded car of coal being upset upon him at shaft foot. The work of the boy Turner was to drive a mule in hauling the empty cars from off the carriage, at shaft foot, back into the branch or turn-out. He had a brother attending the foot, in company with two other young men, and seeing them unable to put the loaded car on the carriage in the usual time, he turned to, and helped them. No sooner were the two front wheels on the carriage than the same was suddenly hoisted, thereby up-ending the car, where the boy (Turner) and the other three young men were, with their backs to the same. They all made their escape, except the unfortunate boy, who was the smaller of the four; and being in the center of the car end, nearly, which, when raised endwise, poured the body of the car-load of coal upon him, whereby he was covered up, and his neck was found to be broken. The three foot-men, the driver boss, and a miner, standing near by, swore before a jury that no signal had been given when the carriage was hoisted. The engineer, (John Morgans,) swore that he had received the usual signal, and hoisted in accordance. Deputy Coroner Doctor J. B. Crawford swore in a jury, who, after hearing the testimony, delivered a verdict, and gave it as their opinion, that the carriage was hoisted before any signal was given from below, thus placing the responsibility on the engineer.

On Surface.

ACCIDENT No. 23.—James Stewart, a young man, working inside at the Boston colliery, near Kingston, was killed by falling under a trip of mine cars outside near shaft head, on the 29th day of October. He had completed his day's labor, had just ascended safely out of the many perils of under-ground life, and to save himself the labor of walking a few hundred feet, he attempted to mount a train of cars in motion, and, by some mishap, lost his hold, fell under and was mortally injured, expiring soon after being taken to his home.

ACCIDENT No. 28.—Charles Nowalk, a laborer, working outside, was fatally injured by falling in front of a moving train of empty cars, near the No. 2 slope, East Nanticoke, on the 16th day of November. It appears that he had jumped off the cars to turn a switch for the same, and in doing

so fell immediately in front of the cars, which ran upon him, with the result above stated.

Total number of lives lost under this head during the year shows a decrease of one from 1876. During the five years preceding 1877 equals 11.49 per cent. of the whole accidents, and in the year 1877 it equals only 5.26 per cent. of the year's accidents, which is 31 per cent. below that of 1876, 40 per cent. below 1875, 33.33 per cent. below 1874, 17.4 per cent. below 1873, and 5 per cent. below 1872.

TABLE No. 5.—List of Fatal Colliery Accidents in the Wilkes Barre District during 1877.

DATE.	Number of accident.	NAME OF COLLIERY.	NAME OF PERSON KILLED.	Age.	Widows.	Orphans.	CAUSE OF DEATH.	NUMBER OF PERSONS KILLED.							
								Explosion of gas.	Falls of roof and side.	In shafts.	By mine cars.	By blasting powder.	Miscellaneous.	On surface.	Totals.
Jan. 17,	1	Hartford colliery, . . .	H. McGiven, ...	36	. .	. .	Killed by his own blast, ...	. .	. .	. .	. .	. .	1		
				. .	. .	. .		. .	. .	. .	. .	. .	1	. .	1
Feb. 14,	2	Diamond colliery, . . .	John Hartland, . .	. .	1	1	Found dead on hoisting carriage at shaft foot, ...	. .	. .	. .	. .	. .	1		
				. .	1	1		. .	. .	. .	. .	. .	1	. .	1
Mar. 1,	3	Diamond colliery, . . .	Nathaniel Griffiths,	58	1	6	Died from effects of wounds received by fall of coal, ...	. .	1						
5,	4	Prospect colliery, . . .	Patrick Maycock, .	34	1	3	Killed by fall of rider coal, ...	. .	1						
7,	5	No. 1 tunnel colliery,	John Donahue, . .	45	1	6	Both killed same time and place by a piece of rock, ...	. .	1						
		Nanticoke, ...	Mirick Johns, . . .	45	1	1		. .	1						
27,	6	Wanamie colliery, . . .	Ellis Ward, ...	16	. .	. .	Killed by fall of coal on main gangway, ...	. .	1						
28,	7	Washington colliery, .	Daniel Learch, . . .	35	1	. .	Died from injuries received from fall of coal, ...	. .	1						
29,	8	Forty-Fort colliery, . .	Francis Dougher, .	25	. .	. .	Killed by fall of rock, ...	. .	1						
31,	9	Hartford colliery, . . .	O. McLarney, . . .	40	. .	. .	Crushed between car and side, and died of injuries received, . .	. .	. .	. .	1				
				. .	5	16		. .	7	. .	1	. .	. .	. .	8
April 4,	10	Empire colliery, ...	P. Washington, . .	. .	1	2	Killed by fall of slate, ...	. .	1						
17,	11	Audenreid colliery, . .	Levi Thomas, . .	29	1	2	Fell down shaft a distance of nine hundred feet, ...	. .	. .	1					
20,	12	Empire colliery, ...	Patrick Quinn, . . .	. .	1	. .	Killed by fall of bone from roof, ...	. .	1						
28,	13	Exeter colliery, ...	James Ellis, ...	22	. .	. .	Killed by fall of slate, called by miners "black rock,"	. .	1						
28,	14	Laurel Run colliery, . .	Martin Cauley, . . .	39	. .	. .	Both killed by a piece of bone coal from roof, through careless-	. .	1						
			Patrick Skiverton,	33	1	2	ness, ...	. .	1						
				. .	4	6		. .	5	1	. .	. .	. .	. .	6
May 14,	15	No. 2 shaft colliery, D. & H. C. Co., Plymouth,	Randal Cooper, . .	25	1	2	Killed by fall of coal while mining out coal partly loosened by shot	. .	1						
23,	16	Hutchison colliery, . .	Dennis Leary, . . .	34	. .	. .	Killed by thin piece of slate falling on him, ...	. .	1						
				. .	1	2		. .	2	. .	. .	. .	. .	. .	2

June 15,	17	Wyoming colliery, . . .	Jackson Ide, ...	35	1	. .	Killed by fall of rider coal, ...	. .	1						
21,	18	Empire colliery, ...	John Mullen, ...	50	1	8	Killed by fall of coal, ...	. .	1						
				. .	2	8		. .	2	. .	. .	. .	. .	. .	2
July 21,	19	No. 2 shaft, Waterman & Beaver, ...	Daniel Heffren, . .	28	. .	. .	Killed by fall of rock while loading, ...	. .	1						
25,	20	Empire colliery, ...	Patrick Dougherty,	17	. .	. .	Found unconscious on the road near his mule, ...	. .	. .	. .	. .	. .	1		
				. .	. .	. .		. .	1	. .	. .	. .	1	. .	2
Oct. 4,	21	Wyoming colliery, . . .	Patrick Sullivan, .	37	1	4	Killed by blast, ...	. .	. .	. .	. .	. .	1		
18,	22	No. 4 slope, Nanticoke,	Nic. Snyder, ...	20	. .	. .	Killed by fall of rider coal, ...	. .	1						
29,	23	Boston colliery, ...	James Stewart, . .	20	. .	. .	Died from injuries received by cars running over him, ...	. .	. .	. .	. .	. .	. .	1	
31,	24	Forty-Fort colliery, . .	Michael Burk, . . .	35	. .	. .	Killed by fall of rock, ...	. .	1						
				.	1	4		. .	2	. .	. .	. .	1	1	4
Nov. 8,	25	Audenreid colliery, . .	Patrick Moyles, . .	40	1	8	Killed by fall of coal, ...	. .	1						
15,	26	No. 1 shaft, Nanticoke,	William Offus, . . .	26	. .	. .	Killed by blast—using patent squibs, ...	. .	. .	. .	. .	. .	1		
15,	27	No. 1 shaft, Waterman & Beaver, ...	Richard Coon, . . .	28	. .	. .	Killed by fall of coal; miner and boss since prosecuted for want of sufficient timber, ...	. .	1						
16,	28	No. 2 colliery, Nanticoke	Charles Nowalk, . .	40	1	4	Killed by falling under cars outside, ...	. .	. .	. .	. .	. .	. .	1	
19,	29	No. 5 colliery, D. and H. Canal Co., Plymouth,	Lewis Price, ...	45	1	4	Died on 22d, of injuries received from explosion of blasting powder; ignited from his lamp, ...	. .	. .	. .	. .	1			
27,	30	Conyngham shaft, . .	John Simons, ...	34	1	5	Killed by falling down shaft, ...	. .	. .	1					
28,	31	Warrior Run colliery, .	Morgan D. Davis, .	26	1	. .	Killed by fall of slate, ...	. .	1						
				. .	5	21		. .	3	1	. .	1	1	1	7
Dec. 3,	32	Avondale colliery, . . .	David T. Jones, . .	26	1	2	Killed by fall of coal, ...	. .	1						
5,	33	Henry colliery, ...	John Hughes, . . .	47	1	3	Killed by fall of a small piece of rider coal, ...	. .	1						
24,	34	No. 1 shaft, Waterman & Beaver, ...	Luke Turner, . . .	18	. .	. .	Killed by car upsetting upon him at shaft foot, ...	.	. .	. .	. .	. .	1		
28,	35	Audenreid colliery, . .	Stephen Tredinnick	18	. .	. .	Died on 29th, of injuries received from explosion of gas, . . .	1							
31,	36	Enterprise colliery, . .	John Nicolson, . .	46	1	2	Killed by fall of coal, ...	. .	1						
				. .	3	7		1	3	. .	. .	. .	1	. .	5
		Totals, ...	. . . . .	. .	22	65	. . . . .	1	25	2	1	1	6	2	38

TABLE No. 6—List of Colliery Accidents not proving fatal, during 1877, in the Wilkes Barre District.

DATE.	No. of accident.	NAME AND LOCATION OF COLLIERY.	NAME OF INJURED	CAUSE OF ACCIDENT.
January 7,	1	No. 6, Ashley,	Patrick Flood,	Had an arm broken by falling under cars.
January 18.	2	Mineral Spring colliery,	H. Zimmerman,	Injured on hip, and otherwise, seriously, by trip of cars breaking loose on slope, and striking him.
January 19,	3	Prospect Shaft,	William Howell,	Had leg broken near ankle; caught between cars and side.
January 25,	4	No. 1 Shaft, Nanticoke,	George Williams, William Hughes,	Williams and Hughes were both slightly burned by explosion of gas.
January 26,	5	No. 3 Slope, Nanticoke, West,	Charles Joes,	Injured quite severely by fall of slate, while going into chamber to beg some tobacco, as he had no other business there, being a door-boy.
February 1,	6	East Boston colliery, near Kingston,	D. Connon,	Left foot injured by being caught between carriage and platform.
February 5,	7	Nottingham colliery, Plymouth,	William Jones,	Leg broken; caught between car and side, or rib.
February 5,	8	Laurel Run col'y, near Parson's Stat'n,	Thomas Williams,	Leg broken; caught between car and side.
February 7,	9	Laurel Run col'y, near Parson's Stat'n,	J. S. McDonald,	Had head and face badly cut and bruised, by coal rolling upon him.
February 10,	10	Pine Ridge col'y, near Miners' Station,	Patrick Schully,	Injured seriously; hip bone broken. While retreating from a blast he had just fired he fell, and blast exploded. Case a very serious one.
February 17,	11	No. 3 Tunnel, West Nanticoke,	Worthy Carver,	Carver was the mine boss, and in passing a chute he was caught between slate that started, and the side, and had leg broken.
February 21,	12	No. 3 Slope, West Nanticoke,	Martin May, Godfrey May,	Both severely injured by explosion of a blast in chamber.
February 24,	13	Mill Creek colliery, near Miners' Stat'n,	John Semore,	Run over by cars, and had leg broken thereby.
February 28,	14	Prospect colliery,	William Watkins,	Burned on face and neck by explosion of gas, having cut a strong feeder of gas in gangway.
March 2,	15	Diamond colliery,	Jos. Costenmyer,	Injured quite severely by a fall of slate from roof.
March 3,	16	East Boston colliery,	George Dean,	Arm broken by fall of coal.
March 3,	17	Lance colliery,	Ed. McGraw,	Injured severely on head by fall of rock.
March 6,	18	Prospect colliery,	Peter Ward,	One finger cut off, and otherwise injured severely. Caught by coals, while riding on rear end of mine car.
March 8,	19	No. 1 Baltimore Tunnel colliery,	Patrick Mulligan,	Hurt very severely, by explosion of a blast. The hole being wet, he, in his hurry, ignited the straw. Case serious.
March 5,	20	Audenreid colliery,	John Corkle,	Injured by explosion of gas, the same having been forced upon his lamp by a piece of coal falling.
March 19,	21	Diamond colliery,	William D. Jones,	Jones was one of the fire bosses, and while entering, in company with A. Charret, another fire boss, they came to the head of the man-way, leading down to the slope working, and there very unexpectedly met a small quantity of gas, which ignited from their naked lamps, burning Jones quite severely, his partner not being much the worse, as it happened.
February 12,	22	Prospect colliery,	M. O. Malia,	Injured on head and knee by pieces of coal and rock from side of gangway near shaft foot.
February 13,	23	Nottingham colliery, Plymouth,	Griffith George,	Leg broken by fall of top coal.

February 16,	24	Enterprise colliery,	Anthony Carlin,	Leg broken by a piece of coal flying from a blast. He had been sent to the next chamber, to notify them of the blast, and forgot all about it himself, until the same exploded.
February 20,	25	Enterprise colliery,	Thos. Duddy,	Injured severely by cars, being run over by a trip.
February 29,	26	Pine Ridge colliery,	Michael Huhn,	Injured on back and breast, by being thrown from top of horizontal gate, over the shaft mouth. He was crossing the shaft upon said gate, when the same was struck by the ascending carriage, and he was thrown violently to the one side. Fortunately for him, he did not fall into the shaft, as he might have done—a victim to his own recklessness.
April 2,	27	Nottingham colliery,	Henry Williams,	Leg broken; caught between the car and door frame.
April 3,	28	Laurel Run colliery,	B. F. Oplinger,	Injured quite severely; being struck with coal from car, while fixing chute in boiler room.
April 7,	29	East Boston colliery,	Richard T. Owens, James Dougherty,	Both injured by a premature explosion of a blast, while tamping the same—ramming the cartridge into the hole.
April 16,	30	Diamond colliery,	L. Englehart,	Leg broken by piece of coal falling upon him from side.
April 17,	31	Laurel Run colliery,	J. McGallick,	Injured severely while riding upon cars in slope, against the law.
April 13,	32	Audenreid colliery,	D. Morris,	Injured on leg by fall of coal.
April 19,	33	East Boston colliery,	W. H. Reese,	Had feet and ankles badly scalded by stepping into a hole in the railroad track, near boiler room, containing hot water, from blowing off steam from the boiler, the steam from which prevented his seeing the pool.
April 19,	34	Henry colliery,	John McGinly,	Injured on head—skull fractured from fall of coal, while laboring for his father, in gangway.
April 21,	35	No. 2 Shaft, Waterman & Beaver,	Isaac Bellows,	Had leg injured so seriously that amputation was necessary.
April 24,	36	No. 3 Breaker, West Nanticoke,	James Jones,	Small bone of leg fractured; caught between railroad cars, near breaker.
April 24,	37	Pine Run colliery,	Henry Somers,	Injured severely on back by fall of coal, while barring out loose coal.
April 24,	38	Exeter colliery,	Thos. Lewis,	Injured by fall of slate—called by the miners, black rock; leg broken near the thigh, and seriously injured.
May 11,	39	Henry colliery,	James Henry,	Had face, neck and arms badly hurt from explosion of a blast, to which he had returned, intending to re-touch. It exploded before he reached the face of his place.
May 14,	40	Henry colliery,	Thos. Durkin,	Very seriously injured by being run over by mine (empty) cars.
May 15,	41	No. 3 Wanamie,	Dominick McCue,	Burnt slightly on face and hands by explosion of gas.
May 16,	42	Prospect colliery,	Charles Rogers,	Had big toe cut off by a piece of coal falling upon it.
May 19,	43	Prospect colliery,	James Hauley, Patrick Managan,	Both burned on their faces and hands by explosion of a small quantity of gas, by opening chamber.
May 26,	44	Nottingham colliery,	Andrew Durkin,	Injured severely by fall of top coal; head cut and hip dislocated.
May 26,	45	No. 2 Shaft, Waterman & Beaver,	Thomas Walsh,	Arms, face, and hands, badly burned by explosion of blasting powder; caused by a spark from his lamp igniting a small quantity of loose powder on top of keg, which ignited that which was inside the keg, consisting of about half a keg, or twelve pounds.
May 28,	46	Enterprise colliery,	Daniel Derr,	Foot badly bruised by mine cars.
May 29,	47	No. 1 Shaft, East Nanticoke,	Evan Reese,	Injured quite seriously by mine car running over him.
May 28,	48	Pine Ridge colliery,	Michael Kelley,	Ankle bone fractured by fall of rock.
May 28,	49	Pine Ridge colliery,	Daniel Harrington,	Slightly burned on back from powder, caused by cartridge bursting.
May 30,	50	Audenreid colliery,	Thomas Jones,	Had finger cut off; caught between door and frame.
June 1,	51	No. 10 slope, Sugar Notch colliery,	M. Brennan,	Leg broken in two places by coal rushing upon him in chute.
June 7,	52	No. 10 slope, Sugar Notch colliery,	John Durkin,	Arm broken; caught between car and door.
June 9,	53	Exeter colliery,	Howell Watkins,	Leg broken by fall of rock.
June 14,	54	Washington colliery,	Thomas J. Jones,	Fell under cars while trying to get on the same; had two fingers of left hand and thumb of right hand cut off; jaw bone broken; upper teeth struck out; a very serious case.
June 15,	55	Prospect colliery,	Martin Garity,	Burned on face and hands quite severely by explosion of gas.
June 16,	56	Prospect colliery,	Thomas Hilbert,	Injured on face, from explosion of a blast which he had gone back to re-touch. The blast was, perhaps, fired by a gas-feeder igniting the straw.

TABLE No. 6.—List of Colliery Accidents not proving fatal—*Continued.*

DATE.	No. of accident.	NAME AND LOCATION OF COLLIERY.	NAME OF INJURED.	CAUSE OF ACCIDENT.
June 16,	57	Empire colliery,	A. Kearney,	Injured severely on face and skull by fall of coal.
June 16,	58	No. 2 shaft, D. and H. Canal Company, Plymouth,	Stephen Stephens,	Injured on back by fall of bone and top coal.
June 23,	59	Audenreid colliery,	Thomas Lynch,	Lynch was burned quite seriously; Nolan and Fury were not so severely burned. All three were burned by explosion of gas, caused through some misunderstanding between the fan engineers and fire bosses by which the fan was stopped while those men and others were in the mine. The case might have been much worse had there been more gas present.
			Hugh Nolan,	
			James Fury,	
June 26,	60	No. 2 colliery, D. and H. Canal Company, Plymouth,	Daniel Myers,	Had ankle dislocated by piece of slate falling upon him.
June 28,	61	No. 4 slope, Nanticoke,	Henry Jones,	Burned severely by gas explosion, in a cross-cut.
July 2,	62	Audenreid colliery,	A. Greenwalt,	Arm broken; caused by playing with mud screen, whereby his clothing caught on set screw.
July 5,	63	No. 10, Sugar Notch,	P. McGowen,	Was slightly burned by gas explosion, caused by brattice being broken by him, and failed to examine with safety lamp.
July 10,	64	Henry colliery,	James Reily,	Injured severely by fall of rider coal while taking car into chamber.
July 11,	65	No. 2 tunnel, Nanticoke,	Henry J. Roberts,	Both hurt by a fall of coal; the former had a leg broken, the latter considerably bruised.
			Thomas R. Thomas,	
July 14,	66	No. 2 shaft, D. and H. Canal Company, Plymouth,	William Pollard,	Injured on back and one knee by fall of slate.
July 12,	67	Prospect colliery,	Patrick Reily,	Hands and face cut badly by explosion of a blast that he was preparing at the time. A gas-feeder ignited from the laborer's lamp setting fire to the squib and thereby exploding the blast.
July 16,	68	Prospect colliery,	Thomas Durkin,	Injured on the head by explosion of a blast. While arranging his squib he ignited a gas-feeder by his lamp whereby the squib was fired and the blast exploded.
July 18,	69	Henry colliery,	James Looby,	Looby and his two laborers were all hurt more or less, but not seriously, by a fall of slate from roof.
			Andrew Keely,	
			Henry McLean,	
July —,	70	Prospect shaft,	J. McMillan,	Injured by fall of rock from roof; not dangerous.
July 20,	71	Exeter colliery,	James Mansfield,	Injured by a fall of rock from roof called "black rock."
August 1,	72	Hartford colliery, near Ashley,	John Clinton,	Clinton was the mine boss, and the fan and pumps having been stopped during the mining troubles of those days, he went down the slope to start the pump, and the gas was ignited either from his lamp or from the fires under the steam boiler at the head of the said inside slope whereby he was seriously injured—breaking one leg in two places, breaking several ribs, and severely burned besides.
August 8,	73	Salem colliery, Shickshinny,	G. Hoffman,	Had leg broken by falling down while trying to get away from a blast he had just fired.
October 4,	74	Gaylord colliery,	Thomas Colter,	Arm badly fractured by car running over him.
October 15,	75	No. 3 tunnel, Nanticoke,	Thomas Kearns,	Injured by coal striking a pick into his knee.
October 15,	76	No. 3 tunnel, Nanticoke,	Daniel Hughes,	Both boys; got hold of a can containing about two pounds of powder, and while playing with it, it exploded, burning both severely on faces and hands.
			William Joes,	

October 16,	77	No. 6 colliery, Ashley,	P. Cringan,	Burned on face and hands by gas explosion while brushing the same down upon his naked lamp.
October 17,	78	Diamond colliery,	John W. Joseph,	Injured by prop falling upon him, the same having been struck by a piece of coal.
October 17,	79	No. 1 tunnel, Baltimore mines,	Daniel Kenny,	While firing a blast, the same exploded before he got to a place of safety. He claims that the patent squib was bad, not giving him sufficient time to get away.
October 27,	80	Lance colliery,	Charles Cordick,	Had three ribs broken by being shot through pillar.
November 2,	81	No. 10, Sugar Notch,	James Hanygan,	Injured on back, his head coming in contact with the platform at head of slope.
November 5,	82	Forty-Fort colliery,	John Dawson,	Burned on face and hands severely by powder explosion, caused by spark from his lamp, which was on his head, igniting powder in a keg, into which he had recently emptied some from cartridges.
November 12,	83	No. 3 colliery, West Nanticoke,	James Grady,	Had skull fractured and leg badly bruised by fall of top coal.
November 14,	84	Nottingham colliery,	James Phillips, Henry Lorat,	Both were door-boys, and Phillips took some powder from a miner, and while at Lorat's door they fired it, and both were very badly burned thereby about legs and stomach and abdomen.
November —,	85	Audenreid colliery,	J. Manging,	Hurt dangerously by a piece of stone falling upon him; being saved only by a car being near him to receive the heaviest blow.
November 20,	86	Exeter colliery,	James Keating,	Slightly injured by explosion of a blast he had just returned intending to re-touch.
November 22,	87	Exeter colliery,	Patrick Loftus,	Leg broken; caught between cars in the mines.
November 23,	88	No. 10, Sugar Notch,	M. Sculley,	Leg broken by coal falling upon him while going into his working place soon after a shot had been fired.
November 24,	89	No. 2 colliery, D. & H. C. Co., Plymouth,	John Hanlon,	Injured by explosion of a blast. He had not given length enough of fuse to blast, hence too short a time before the explosion.
November 24,	90	Henry colliery,	L. Brady,	Burned on face and arms; having ignited a feeder of gas in face of cross-cut.
November 24,	91	Henry colliery,	Peter Higgins,	Injured by explosion of a blast; had jaw bone broken, and face badly cut. He cannot describe how accident occurred.
November 26,	92	No. 10, Sugar Notch,	Hugh Conahan,	Had hand badly hurt by pulling away a block from before a loaded car.
November 27,	93	Exeter colliery,	Thomas McKin,	Had arm broken while meddling with putting up a door which fell upon him. He was a door-boy.
December 4,	94	No. 2 tunnel, Nanticoke,	E. K. Edwards,	Leg broken by fall of top coal.
December 4,	95	Prospect colliery,	John Stetzer,	Burned on face and hands, severely, from explosion of gas in chamber, very mysteriously.
December 4,	96	Exeter colliery,	Thomas Mullen,	Injured on head and shoulders; crushed between car and side.
December 10,	97	Diamond colliery,	A. Dean,	Leg broken by piece of coal from side falling upon him.
December 13,	98	No. 2 shaft, Waterman & Beaver,	John Richards,	Skull fractured from piece of coal falling down shaft, striking cover of carriage and glancing off, striking him on the head; case a very serious one.
December 13,	99	Exeter colliery,	James Davis,	Injured severely on hips, and slightly on head, by a piece of "black rock."
December 17,	100	Mill Creek colliery,	Seldon Scott,	Bone of foot fractured by iron pulley falling upon it.
December 18,	101	Lance colliery,	James Mahoney,	Hip bruised; caught between car and side.
December 22,	102	East Boston colliery,	George Motteran,	Had finger taken off while attempting to sprag cars in motion when passing his door.
December 27,	103	Washington colliery,	William Jones,	Ankle broken; cars having run over him.
December 28,	104	No. 10, Sugar Notch,	George Klinger,	Injured severely by falling down a distance of two hundred and fifty feet on the slope, a plank having caught and thrown him off.
December 28,	105	Audenreid coll'y, near Wilkes Barre,	John Griffiths, Lewis S. Jones, Richard Roderick, Patrick Kerrigan, Thomas Malia, Peter Stump,	All these persons were burned by explosion of gas in Gibbon's gangway. Griffiths is the most seriously burned, except the boy Tredinnick, who was as much injured probably from his clothing being on fire and his exposure by being compelled to remain in a nude state until assistance came, and again in being taken to his home, as he did from his burns from the gas. He died the next day. The cause of this explosion is somewhat a mystery, yet I am of the opinion that the canvas doors attended by Tredinnick had been somewhat neglected about this time, there having been a connection cut into another place at the face of the said gangway. The mine was generating considerable gas at all times. I measured the air the following day and found 7,500 cubic feet per minute passing in that direction.

LUZERNE AND CARBON COUNTIES.

EASTERN DISTRICT.

To His Excellency JOHN F. HARTRANFT,
Governor of the Commonwealth of Pennsylvania.

SIR: Pursuant to the requirements of the twenty-second section of an act, entitled "An act providing for the health and safety of persons employed in coal mines," approved March 3, 1870, I herewith submit my second annual report as inspector of coal mines for this district, for the year ending December 31, 1877.

I have prepared the information I have to give relative to the fatal and non-fatal accidents in tabulated form; and I have also given the details attending, and the circumstances leading to, all the fatal accidents and some of the non-fatal ones, at considerable length. I have done this, hoping that all parties interested will read them and take warning, so that they may not be overtaken with the sad fate of their unfortunate fellow-workmen, who have undoubtedly fallen victims to their own inexcusable negligence and recklessness.

The number of deaths from accident, during 1877, is 40, which is 4 less than for 1876; the number of persons injured is 174, an increase of 54 over the number for 1876. Many of these, however, are slight injuries, and would not have been reported in former years. The number of widows for last year is 29, with 134 orphans. The number of tons of coal mined for each life lost, in 1876, was 110,511, and for 1877 the ratio was 120,205 tons for each life lost, the total production for last year being 4,808,208 tons, and 4,862,512 tons in 1876.

Table No. 1 contains a condensed statement relative to the fatal accidents. Table No. 2 contains the same relative to accidents not proving fatal. Table No. 3 gives the number of persons killed and injured for six years, and the causes of the same, together with the number of widows and orphans for each year for the same period. Table No. 4 gives the number of tons of coal produced for five years, commencing with 1872 and omitting 1873, for want of data, number of persons employed, number of tons of coal mined for each person killed and for each person injured, and the number of persons employed for each life lost. Table No. 5 gives the amount of coal mined, number of kegs of powder used, number of days worked, number of persons employed inside and outside, number of tons of coal mined for each person employed, for each person killed, and for

each person killed and injured at each colliery in operation during 1877, and also the ratio of coal production per person killed and per person injured at each of the said collieries for the last four years. Table No. 6 relates to steam boilers and machinery, steam engines and pumps. Table No. 7 gives the dimensions of shafts, slopes, tunnels, and drifts, and includes all that were in operation during the year. Table No. 8 is intended to give some data relative to fan ventilation, working speed of the fans, amount of air exhausted and horse power expended to produce these results, and also the conditions under which these results were obtained. Table No. 9 is intended to show the power exerted on ventilation by furnaces, by which it will be seen that the money expended on most of our furnaces is very unwisely invested and nearly as bad as if thrown away. There are several fans and furnaces which are not included in the above named tables, which I explain in the body of my report. Table No. 10 is intended as a mine directory, giving the names of all collieries in the district, their location, names of operators, agents, superintendents, mine bosses, &c.

In the body of the report, will be found such views as I hold on the causes of accidents, and how to avert them, on qualifications of mine bosses, on the duties of mine bosses, and workmen, on mine discipline, on ventilation, on mine maps, on improvements made and to be made, and several other things, which I have come in contact with in the discharge of my duties. I am happy to be able to say that considerable improvement has been effected in the ventilation of the mines in this district, during the last year; and considering the state of the coal trade, these improvements have been immense. I have succeeded in having thirteen new fans erected, which, with other improvements connected therewith, such as sinking air-shafts, improving air-courses, &c., cannot have cost under $50,000; but the money is well expended, and those who have done the most, are more than satisfied with the result. But there is much more yet to be done, and I am in hopes that there will be no unnecessary delay in doing it.

In my relations with all having charge of the mines, I have cause for great satisfaction, for I have forced improvements as persistent as the existing state of the trade would warrant, and yet I have been treated with uniform kindness and respect, at all times and under all circumstances, and I desire to return my sincere thanks to all for the consideration with which I have been treated.

The above, in brief, will give your Excellency an idea of the subject matter treated in the following report, all of which is most respectfully submitted by

Your humble and obedient servant,

WILLIAM S. JONES,
Inspector of Mines.

Scranton, Pa., *March 9, 1878.*

Accidents from Falls of Roof and Coal.

The number of accidents, resulting in deaths, from "falls of roof" and "falls of coal," in this district, for last year, is fearful to contemplate. Thirty-one lives were lost in this manner, out of a total of forty fatal accidents, making over seventy-five per cent. of the whole number. And the number of persons injured during the year, from the same causes, is sixty-four. We are accustomed to call these "falls of roof" and "falls of coal" "accidents;" but I am firmly convinced that the term, in at least nineteen cases out of twenty of the so-called accidents in the mines, is entirely inapplicable. An "accident" is something unavoidable, unforeseen, and beyond human control; but our so-called mine accidents are very seldom of this nature. They are, almost in every case, foreseen, and with reasonable care, might be easily avoided. There is not a miner in the coal region, who does not know that nearly all the accidents, from the falling of roof and coal, are the result of inexcusable carelessness and neglect. Procrastination is the criminal fault. Though the danger is well known, still the miner will persist in putting off doing the one thing needed, until it is too late, and he pays the fearful penalty of his neglect, with his life; or he becomes morally a murderer of his laborer, perhaps, who is hurled into eternity through his reckless carelessness. There is not one instance of an accident, from these causes, occurring during last year, where the miner was not aware of the danger; and in many instances, the mine boss knew also of the danger, and knew of the miners' neglect to make their places secure, and still allowed them to go on with their reckless and criminal carelessness until they, or their laborers, or both, or some one else, were either killed or maimed for life. There is not near enough timber used for propping in our mines, and I am entirely at a loss to know what to do to remedy the evil. The inspector can do but little to reduce these accidents, unless the miners and the mine bosses will do their part. And I have but very little hope of a reform on the part of mine bosses and miners, until our courts will sustain the inspectors, by enforcing the penalties of the Mine Ventilation act upon them for their neglect.

The eighth section of the mine ventilation act sets forth the duties of the "mining boss" in relation to this matter in the following words: "He shall keep a careful watch over the ventilating apparatus, over the airways, the traveling-ways, the pumps and sumps, *the timbering;* to see, as the miners advance in their excavations, that all loose coal, slate, or rock overhead is carefully secured against falling; * * * * * and over all things connected with and appertaining to the safety of the men at work in the mines, &c."

Now, how is a mine boss to perform these duties? Can he do it without examining every working place under his charge at least once per day? Can he do it by simply walking into a working place, passing through it, without examining the overhanging coal, slate, and rock by sounding it and feeling it? Can he do it by only visiting the working

places on alternate days, or perhaps only twice a week, and then by simply looking at them? Can he do it by simply calling the attention of the miner in charge of a working place to the danger, (if by chance he discovers any,) and leave it optional with him whether he makes the place secure or not? Can he do it by spending his time with gun and dog, hunting on the surrounding mountains? Or, am I mistaken in relation to the nature of the duties of mine bosses under this section of the law? Does the law mean that there is any responsibility resting upon a mine boss? As I understand it, these duties are mandatory: "He *shall* keep a careful watch over * * * * the timberings; to see, as the miners advance in their excavations, that all loose coal, slate, or rock overhead is carefully secured against falling, &c." The law does not say he *may* do this if it suits his convenience; but he *shall* do it, and do it carefully; and if he neglects or refuses to do it, or any other duty provided for and required to be performed by this act, the penalty is "imprisonment and fine, or either, at the discretion of the court trying the same."

And I contend further, that this neglect and refusal on the part of mine bosses to perform the duties devolving upon them under the law, in most all cases, is *willful*, and hence, in the highest degree, criminal. There are cases, however, where the mine bosses cannot perform these duties properly, because they have too large an area of workings under their charge, but there are only a few cases of this kind. They never complain of this, but I am sorry to find mine bosses, with a few exceptions, with one accord excusing themselves for not enforcing the law relative to propping. They say that they are employed and paid by the companies to look after their interest, and not as watchmen over the "health and safety of the men employed in the mines;" that the inspectors should not hold them responsible; that they are answerable and responsible only to their employers; that they cannot prevent all accidents, therefore, it is useless to try to prevent any; and that if they attempted to enforce the law, the workmen would call them tyrants, and, hence, the workmen must take care of themselves, without any assistance from them. I have been met with all these lame excuses until I am sick at heart when forced to listen to them; and I have thought many times that it was high time to convince our mine bosses that they *are* responsible to the law, as well as to their employers, and that they have "the health and safety of the men employed in the mines" to watch over, as well as the interests of the operators and corporations, and if they give no other cause for the workmen to call them "tyrants" than by compelling them to keep their working places in a safe condition, they can sleep with quiet consciences. The workmen, instead of calling them "tyrants" for doing their duty, will honor and respect them. Good discipline is not tyranny, but an invaluable blessing to all concerned, and an absolute necessity if we desire to reduce the number of deaths and serious accidents in our coal mines, and the untold misery and suffering resulting therefrom.

There is a prevailing idea that these accidents in our coal mines must occur of a necessity, and I am sorry to say that this idea has been promulgated, and is held by our court, to palliate and shield mine bosses and miners from the punishment they richly deserve for neglecting and refusing to perform their respective duties under the law. I have great respect for our judiciary in this county, and I would cut off my right hand before I would indite one word reflecting unfavorably upon it; but our honorable court must allow me to submit that, from my own personal experience as a miner for over sixteen years, I know this idea to be erroneous, and that not one in twenty of the accidents which occur in the coal mines of this district are necessary. If I could persuade myself to believe otherwise, I would never complain of carelessness and negligence on the part of either mine bosses or workmen; but knowing, as I do, that nearly all of these accidents can be averted if men will exercise proper precaution, I cannot refrain from arraigning those who neglect and refuse to do their utmost to avert them. I am sometimes asked, what I would advise as a means for mine bosses to use to induce their miners to timber their working places properly. My answer is, that whenever a mine boss discovers a prop wanting, or coal, slate, or rock which needs barring down, he should invariably stop the miner in charge of such a working place from doing any other work until he has stood the prop, or drawn down the dangerous coal, slate, or rock which hangs loose over him. Let this be done during 1878, generally throughout this district, and my next annual report will have a much shorter list of deaths and accidents. What I here suggest is not a hardship. The workmen will lose nothing by it. It will cost them nothing but a few minutes' work, and many of them will be living a year hence if they do as I suggest, who, if they neglect or refuse to take this advice, will be in their graves, the victims of their own inexcusable negligence and carlessness.

I have no desire to be oversevere on mine bosses. Many of them, and indeed nearly all of them, are my warm personal friends. I hold them responsible because the miners are under their charge, and that the propping is to be done under their direction; but this does not relieve the miner from *his* responsibility under the law by any means. He has duties to perform as well as the mine boss.

The nineteenth section of the act of March 3, 1870, says: "Any miner having charge of a working place in any coal mine or colliery, who shall neglect or refuse to keep the roof thereof properly propped or timbered, to prevent the falling of coal, slate, or rock, every such person shall be deemed guilty of a misdemeanor, and, upon conviction, shall be punished by imprisonment and fine, at the discretion of the court."

Now, this clause is almost entirely a dead letter, as well as the clause quoted from the eighth section, pertaining to the duties of mine bosses. The miner is excused from blame, because he sometimes works under the dangerous overhanging "loose coal, slate, or rock," himself.

It is claimed that the fact of his working in danger himself, is positive evidence that he does not "knowingly" neglect or refuse to keep the roof of his working place properly propped and timbered. Such deep logic is beyond my comprehension, and I cannot agree with it. If a miner *knows* the roof of his working place to be dangerous, and neglects to stand props under it, he *knowingly* neglects; and his working under it, knowing it to be dangerous, is criminal, for the law intends to defend such insane parties from endangering even their own lives.

And again, if a mine boss tells a miner that the roof of his working place is dangerous, and orders him to stand props under it, he must *know* it to be dangerous, and if he *refuses* to obey the order, he "*knowingly refuses* to keep the roof of his working place properly propped and timbered," and this is what the law makes a misdemeanor, punishable by imprisonment and fine. The law comes in to protect the miner's life and limb against his own negligence, and no man has a right to endanger even his own life in this manner, any more than he has a right to take poison. In cases of this kind in England, where a miner is injured by his own violation of the "Mine Regulation Act," as soon as he recovers, he is prosecuted for his negligence, and punishable for it, as if it were some other person that was injured. I would hesitate some in going to this extreme; but where the neglect and carelessness of a miner results in the death of, or serious injury to his laborer, or any person other than himself, I am firmly of the opinion that he should be held to a strict accountability.

One great reason why so many accidents occur from "falls of roof," and "falls of coal," is, that we have hundreds of men employed in our mines as miners who are wholly incompetent, and entirely unfit to have charge of a working place. This class cannot detect dangerous roof unless it is *very* dangerous, and cannot stand a prop properly, nor judge of the amount of powder necessary to blast out the coal. My attention was lately called to a party of this class, consisting of two miners, (?) who were working together, and who had just fired a blast in their chamber, when one of them went forward to see what execution the blast had done. On reaching near the face of the chamber, he called out to his partner, "Mike! two props are down! and faith the car is off the track! and be jabers the road is broke! and divil the bit of coal at all, at all!!" The coal had been blown into the gob by an overcharge of powder, leaving only the damage above described as the result of the blast. In cases like this, the men get wild; they rush in to re-stand the props, without giving a moment's thought to the condition of the roof; they have no coal down to load the next car, and, in their excitement, they are killed or injured by the roof falling upon them. And if they happen to be entirely out of coal, they frequently let the props lay where they fall, and rush for a drill to put in another hole as soon as possible; and perhaps they will let the props lay there for the balance of the day, and the roof falls, killing their laborers, perhaps, after they have gone home.

This class of miners seldom, if ever, have a full set of tools. They seldom have an ax or saw to prepare "cap-pieces" and wedges to fasten their props in place, and a crow-bar is hardly ever found in their possession. It is impossible to stand props properly without the necessary tools, and without a good strong crow-bar, overhanging coal, slate, and rock cannot be barred down. The miners use their drills to do this work, but a drill is not heavy and strong enough. They put a drill over a large overhanging slab of rock or bone, and bear down upon it, but they do not exert their whole strength upon it, because they know that it will bend, or that the bit will break. In passing through the mines to examine the workings, I have often come upon men working under heavy slabs of rock, or large areas of bone, and order them out until the rock or bone, (as the case may be,) is barred down, always insisting that this be done in my presence, and sometimes doing it myself. Almost invariably, the first tool brought will be a drill, and the miner will glory at his failure to bring the dangerous piece down. But I call for a crow-bar, which the man has not. Then I send him to the adjoining chambers to borrow one, and it often happens that several chambers are traversed before one is found, and when it is brought and used in place of the drill to bar down the overhanging rock, it hardly ever fails to do the work effectually. Then the men cross themselves and say: "God sent you here, sure! If you had not come we would all be killed! The Lord save us!"

The miners complain that they cannot afford to keep a full set of tools; but I do not think this is a sufficient excuse. I know the workmen have a hard struggle to provide a scant living for their families, but the cost of these additional tools is nothing compared with the benefit of having them. Every miner should be compelled to furnish himself with all the tools necessary to enable him to keep his working place safe, and if it be true that the miners cannot pay for them, then their employers should be compelled to provide them. Twenty-five or thirty years ago, a set of miner's tools was worth considerable money, and consisted of from six to nine mining picks, two drills, scraper, needle, an ax and saw, a crow-bar, bottom pick, rake, shovel, and a sledge and wedge; but now, if a miner has two drills, scraper, needle, and one mining pick for his own use, and a bottom pick, rake, and shovel for his laborer, he considers himself supplied with all he needs. But it is time that I should notice those accidents more particularly, which I shall do in the order, as to time, in which they occurred.

ACCIDENT No. 2 IN THE LIST.—Henry Theile, a miner, was killed by a fall of top coal on the 9th of January, at the Filer colliery, Winton. His partner, Fritz Sourkemp, on the examination into the cause of the accident, gave the following statement: "Henry Theile came in to his work about nine o'clock in the morning. He had intended not to come to work that day, for he said he had a presentiment that some serious accident was about to happen either to himself or to some member of his family. This

feeling, he said, was caused by the howling of his dog. His wife, however, was not so much alarmed as he was, and urged him to go to work, and very reluctantly he went. He came in, and immediately went under a piece of overhanging top coal to work out a blast he had fired the day before, and he had only struck a few blows with his pick when the top coal fell upon him, injuring him so that he died in four hours afterwards. I often quarreled with him on account of his unwillingness to stand props to keep the roof safe. He was always in too much of a hurry—hurry at his work, and hurry to get home. Neither of us had examined the top coal to see whether it was heavy or not."

Accident No. 4.—David Edwards, a miner was killed, January 15th, at the Erie shaft, Carbondale township, by a fall of roof. This unfortunate man had had his cars stopped by the mine boss a few days before, for neglecting and refusing to stand props. While idle, he had attended to the propping to the satisfaction of the boss, and had been permitted to resume his work; but one of the first blasts which he fired after resuming, knocked out two of the props which he had stood, and instead of immediately restanding them he let them lay and went on with his work, and some time after, the roof fell upon him. I have my doubts as to whether he was killed by the fall or by the parties who lifted the rock off from him. His head was crushed, and it is more than probable that this was done by his rescuers lifting on the wrong side of the rock in their undue haste and excitement. I judge this to be the case from the fact, as stated by those present, that he cried out fearfully when the rock was being lifted off from him and then suddenly ceased.

The chamber was badly propped, and on going through other parts of the workings, I found great neglect in propping manifest in every direction; and on my taking Joseph Davies, the mine boss, to task for this neglect, he informed me that he could not induce the men to stand props. I found one chamber so fearfully dangerous that I ordered the laborers out of it, telling them to go home while they were able to go without assistance; and I ordered Mr. Davies to discharge the miners and not to allow them to work there any more without my consent. This was done, and after that there has been no further trouble with propping in that shaft.

Accident No. 4.—William Durkin, a laborer, was injured fatally, January 15th, at the Hampton shaft, Hyde Park, by a fall of roof. His back was broken, and he died February 13. This accident occurred through the recklessness of the poor man himself and the neglect of his miner, William Y. Edwards. From the statements of both men, it appears that they had tried to bar down the rock which fell, but they failed. Then Durkin asked Edwards to get his wedge to force it down, but the latter thought it would stand until Durkin had loaded some coal from under it; Durkin went at it loading the coal while the miner sat on one side watching the rock, and seeing it breaking from the rib, he cried to Durkin, but before he could get away he was caught. It is very evident that either one of

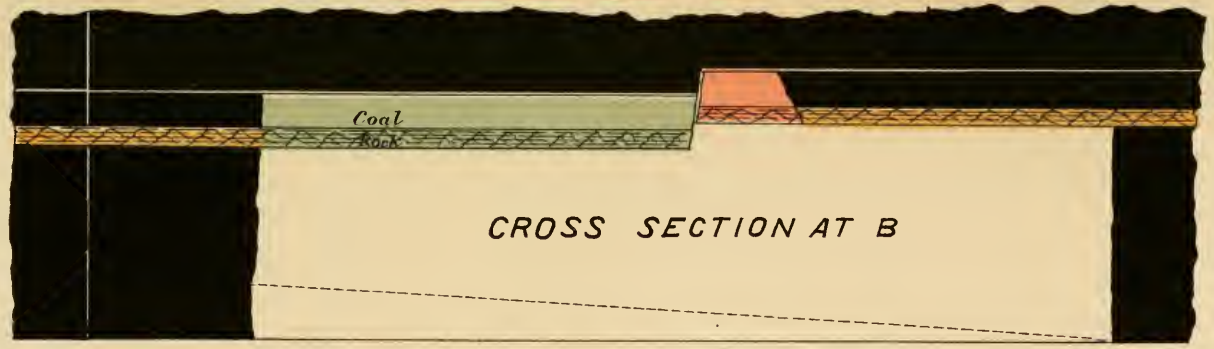
The other miner, Anthony Harrison, testified, that they had sounded the slab with a drill, and that they knew it was heavy, but said that it was too high for them to bar it down. In this, however, he was mistaken, for they could easily have prepared a place to stand upon from which it could have been safely reached. There ought to be a wooden "*horse*" in every working place where the roof is twelve feet high and upwards, to enable the men to get at the roof to wedge props, &c. They are provided in some collieries by the operators, and they ought to be provided everywhere.

ACCIDENT No. 15.—Michael Ruane, a laborer, was instantly killed, June 5th, in a chamber worked by Thomas Roach, in the Bellevue shaft, Lackawanna township, by a fall of roof. This poor man lost his life by what I must pronounce as the most criminal neglect and reckless carelessness on the part of Thomas Roach, and the most inexcusable and unjustifiable neglect of duty on the part of John Hale, the mine boss. The facts in the case, as brought out in my examination into the cause of the accident, are as follows:

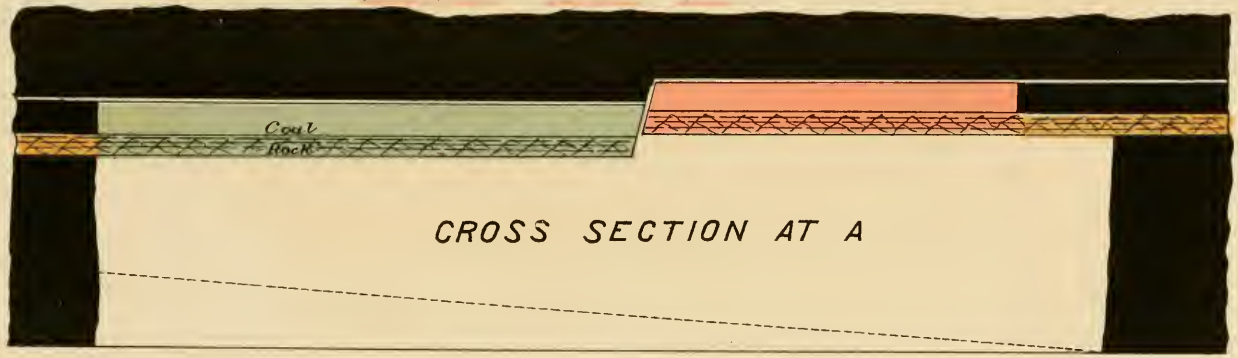
Thomas Roach and John Gerrity had been for some time working together, and Edward Getrick and Michael Ruane were loading coal for them. About a week previous to the accident (?) the parties had paired off, and each of the miners were given a separate working place—Roach and Ketrick going together to one place, and Gerrity and Ruane going together in another place, about one hundred and ten yards away. Thomas Roach was in charge of the chamber where Ruane was killed, but was away at the time of the accident, in Gerrity's chamber, helping the latter to tamp a hole. He had left his own chamber, with tons of rock and coal hanging there, liable at any moment to fall, killing any one who might chance to be there; and it *did* fall, and killed poor Ruane, who had gone in there with an empty car, which he assisted Ketrick to push up to the end of the track, after the driver had unhitched his mule. After pushing up the car, Ruane passed to the right of it, under the mass of overhanging rock, as shown by the carmine color on the accompanying plan, while Ketrick went to the left of the car, to A. Just as Ruane got fairly under the dangerous mass, it fell upon him, killing him instantly. The area which fell was ten square yards, and this consisted of fourteen inches of rock and fifteen inches of coal, making it twenty-nine inches in thickness. The following plan of the place will show its condition better than words can describe it:

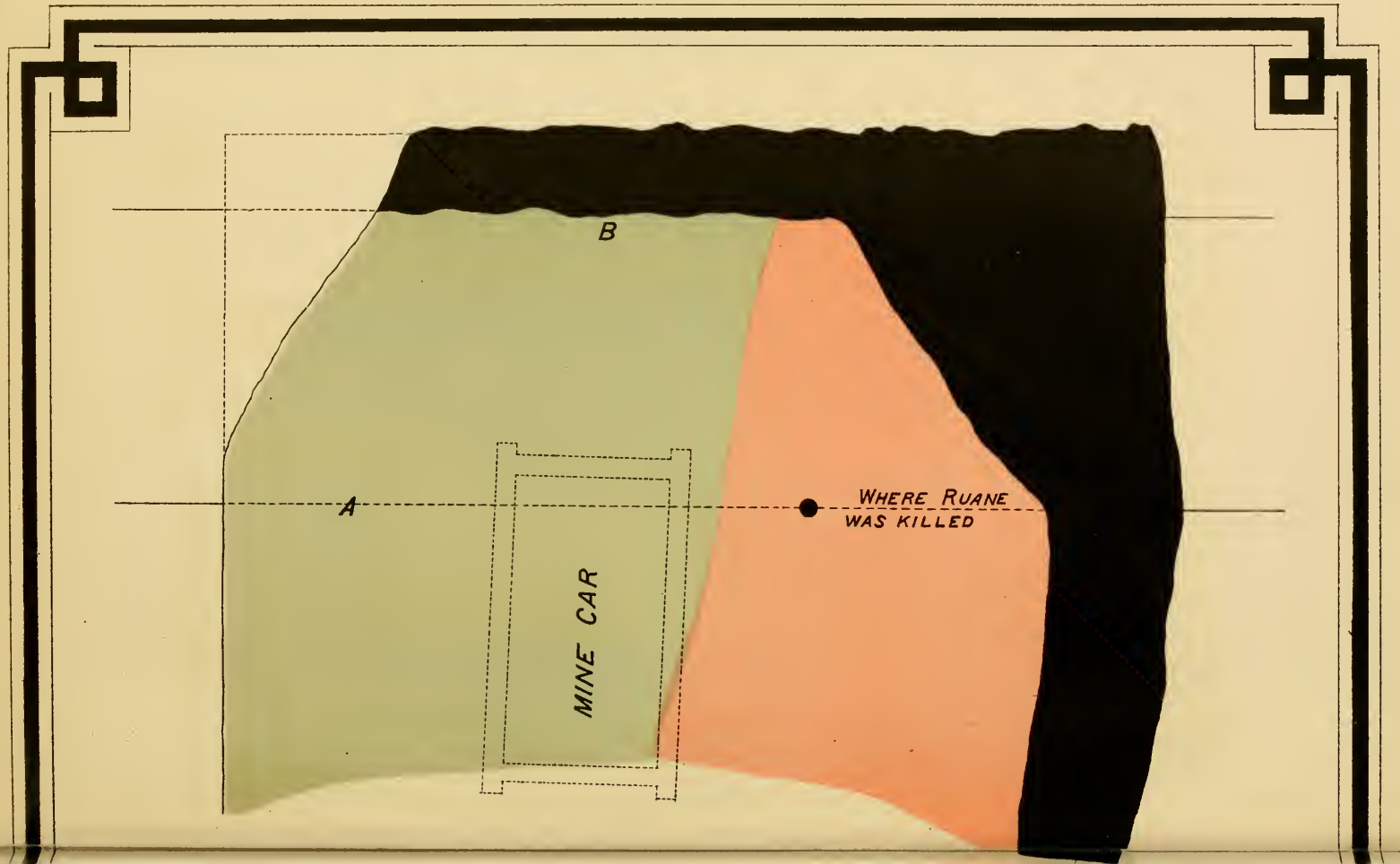
The first diagram, in which the outlines of the car is seen, is a horizontal plan of the chamber, the carmine color showing the area of the fall, and the spot where Ruane was killed is marked. The second diagram is a vertical cross section of the chamber at B, or face of the chamber. And the third diagram is a vertical cross section at A. The carmine in all shows the relative width of the fall at A and B. The division between the carmine and blue, in all three diagrams, shows a break caused by a "slip" running nearly parallel with the chamber. The white line over the fifteen inches of coal indicates a "smooth" or glossy parting.

Horizontal Scale 1"=4'



Vertical Scale 1"=8'




B
A
WHERE RUANE
WAS KILLED
MINE CAR

Thomas Roach knew this mass of rock and coal to be dangerous. There can be no doubt about that, for his attention had been called to it on the morning of the day before the accident by John Hale, the mine boss. Mr. Hale had ordered him to bar down a piece, which is not shown on the diagrams, and further ordered him to stand two props under the mass, on the right of the road. Instead of obeying this order, he went on with his work to find coal for his laborer. He only worked to secure his place, according to his own testimony, for about fifteen minutes, and Gerrity, who had happened in there, assisted him. He drilled and fired two holes in the coal, and did not stand the props which Hale had ordered; and it was proven that he had no timber in the chamber to prop with. He went home that day leaving his place in that dangerous condition. The following morning he went to his work again, neglecting to bring prop timber in with him to secure his place; and he worked on until about ten o'clock, when Mr. Hale goes there the second time, and finds that his order of the day before had not been obeyed. Hale calls Roach's attention to the want of props the second time, and passes on. Then Roach gets a wooden mine rail, three by five inches, and stands it under the dangerous roof, and soon afterwards he found an old decayed prop, rotten to the core, and two feet too short, which he stood on a pile of rocks under the mass, in addition to the rail! He then again went about other work, when he must have known that the mine rail under such a mass was only little better than a reed, and that the rotten prop was utterly worthless.

As already stated, John Hale, the mine boss, had been there on Monday morning, the day before the accident occurred. He had examined the roof enough, at least, to know that it was dangerous, and had ordered Roach to stand props to make it safe, and he had a right to expect that his humane and very proper order would be obeyed. I have no fault to find with John Hale for his course on his first visit. But he entered that fatal chamber on the morning of the day of the accident, and found that his order of the day before had not been carried out; and he simply repeated his order, and passed on, when he should have used his authority, and stopped Roach from doing any other work until the props were stood. Here is where John Hale, in my opinion, failed to do his duty under the law—he failed "to see, as the miners advance in their excavations, that all loose coal, slate, or rock *was* carefully secured against falling," as required of him and all other mine bosses by the eighth section of the Mine Ventilation act. He did not so much as inquire whether Roach had props in his chamber *to* stand or not. I honestly consider both the mine boss and the miner very much to blame for this sad accident, and when I felt constrained, in the performance of my sworn duty, to cause their arrest, I felt the duty to be a very unpleasant and painful one. All the parties, excepting Mr. Hale, were entire strangers to me, and Mr. Hale and I had always been on friendly terms, and if I could, in any way consistent with my duty, have passed the case by, I would have done so; but I felt that I

was sworn to execute the law, and that I had no discretion in the matter; hence, "with malice toward none, and charity for all," I had Hale and Roach both arrested and bound over to court to answer for violating the Mine Ventilation act of 1870. The case came up for trial at the September term, and, in a very unexpected manner to me, I was unceremoniously thrown out of court, and barely escaped being saddled with the costs. I had no desire to punish either Hale or Roach, but I did have a strong desire to establish what seemed to me to be the true meaning of the law relative to the duties of mine bosses and miners, and their responsibilities, respectively, in regard to propping. My failure to do this gave free course to the recklessness that followed, and accounts, in a great measure, for the heavy mortality from falls of roof and coal in my present report.

ACCIDENT No. 16.—Bartley Dean, a miner, at No. 6 slope, Pittston township, was instantly killed, June 7th, by a fall of roof. James Jordan, the other miner, was also very seriously injured by the same fall. These men, a few days previous, had been stopped by Alexander Thompson, the mine boss, because they did not properly prop their chamber. After complying with his orders, they were allowed to resume their work; but they were determined, apparently, to bring on an accident, for they soon knocked out some props which had been stood, and neglected to re-stand them. The roof of their chamber was very bad, and consisted of heavy rock, cut up by numerous irregular seams, so that great care was necessary in order to keep the place safe. After knocking out the props, Jordan suggested that they all go back from the face until the roof should have time to settle; but Dean objected to that, and ordered the laborers to take away some coal from the dangerous place, which they very properly refused to do, because they considered it too dangerous. Dean then went at this work himself, and Jordan commenced drilling a hole in the face, and while they were thus employed the roof fell, with the result already stated. Dean left a widow with seven children.

ACCIDENT No. 17.—James McShurley, a laborer, working for William J. Morgans, at the Cayuga shaft, Providence, was instantly killed, June 15th, by a fall of roof, while assisting to re-stand a prop which had been knocked out by a blast. Morgans was severely injured by the same fall. The roof was bad all through the chamber, but it was well secured with props. He had used every ordinary precaution to ascertain the condition of the roof, which so suddenly fell with such sad results. This was an accident in the true sense of the term, and Morgans has the satisfaction of knowing that his laborer was not killed through any neglect of his.

ACCIDENT No. 18.—Patrick Gavan, a laborer, working for Mark Price, at the Filer colliery, Winton, was killed, June 25th, by a fall of roof. This is another case where the carelessness of a miner resulted in the untimely death of his laborer. The mine boss, Timothy Parfery, had ordered him to stand two rows of props in his chamber, but he neglected doing so; he knew that the roof was heavy and dangerous, but still did not timber it;

there was an area of thirty-seven square yards without a single prop, and there it was that the roof fell. Parfery did not do his duty as required by law, and was as much to blame as the miner. This case is similar in every particular to accident No. 15, which I have given at length.

Accident No. 19.—Patrick Mulderig, a miner, at No. 4 shaft, Pittston, was killed, June 26th, by a fall of roof. Mulderig and William Welsh were working together as partners, and Welsh admitted to me, that he was so much afraid of the roof that day, that he managed to keep away from under it as much as possible. He had spoken to Mulderig about it, but the latter assured him there was no danger; but Welsh being one of the miners, was equally responsible with Mulderig for the unsafe condition of the chamber. On examining it, I found ten inches of bony coal hanging over the whole breadth of the chamber, and extending back several yards from the face. Welsh deserves severe censure for his carelessness and neglect, and he freely admitted that he was very much to blame for not insisting on barring the dangerous roof down. Mulderig left a widow with six children.

Accidents Nos. 20, 21, and 23.—These were of the same nature as the one last noticed. James Hagan was killed at the Fair Lawn slope, Scranton, June 26th, by a fall of roof, through his own neglect and through his persisting in working in the place in utter disregard of the mine boss' order.

James Killbride was killed at the Dawson shaft, Pleasant Valley, July 2d, by a fall of roof. Anthony Churchfield, his partner, was seriously injured at the same time, through refusing to obey the orders of the mine boss.

Miles Boyd, was killed at the Elk Hill colliery, July 3d, in the same manner.

Accident No. 24.—John Brennan, a miner, at the Coal Brook tunnel, Carbondale city, was killed July 6th, by a fall of roof. Brennan and his son were working together. They had no coal down, a blast which they had just fired having failed to do its work. There was considerable "falling roof" projecting out from the face where the blast had been fired; and notwithstanding the repeated warnings of his son, and without examining the roof himself, he went under it to bar down some coal, to finish loading a car, which was standing in the chamber, and a large piece fell upon him, killing him almost instantly. He left a widow and eight children.

Accidents Nos. 25 and 26.—William Alsop, a miner, at the Filer colliery, Winton, was killed July 11th, by a fall of top coal. Alsop was a victim of his own negligence. He and his brother, (Thomas Alsop,) worked together on the night shift, and had gone to work early on that afternoon, and each drilled a hole, which they fired, in what is known as the "mining bench." One of the blasts was a failure, and William Alsop, disregarding the warning of his brother, rushed in to work out the coal, when the top coal fell upon him, fracturing his skull.

William Williams, a miner, at No. 1 tunnel, Pittston, was killed July 16th, by a fall of top coal, almost exactly in the same manner as Alsop.

ACCIDENT No. 27.—Richard Jackson, a miner, at the Twin shaft, Pittston, was fatally injured, July 16th, by a fall of roof, and died of his injuries within ten days. His working place was in a very dangerous condition, and was very poorly timbered. He lost his life through his own inexcusable negligence.

ACCIDENT No. 28.—John Richards, a miner, at the Cayuga shaft, Providence, was instantly killed, July 17th, by a fall of top coal. Richards was opening a chamber, and had just had his branch laid in from the gangway; but the track was so close to the pillar, that a car would not pass, so that it became necessary to shear off some of the coal. He was doing this when the coal fell, which killed him. He had been ordered that morning by Thomas Watkins, mine boss, to draw the dangerous coal down; and his attention had been called to it, during the day, by five other persons, and the laborer and mine carpenter were among the number. He, however, paid no attention to these repeated warnings, but acted as if he were determined, deliberately, to commit suicide. The laborer had refused to go under it, and Richards contemptuously asked him: "What's the matter? Be you afraid of it?" And the laborer answered that he was afraid of it. He then sent the laborer away to the box, to fill his lamp with oil, and while he was away on that errand, he heard the coal fall; and when he returned, he found Richards dead. He left a widow, with seven small children, in very destitute circumstances.

ACCIDENT No. 29.—Martin Hart, a laborer, working for Thomas Joyce, at the Twin shaft, Pittston, was instantly killed, September 3d, by a fall of roof. His miner had told him that the roof in that part of the chamber was unsafe, and ordered him not to go there; but while the miner was at his box, getting a wedge to force the slab down, Hart, in utter disregard of the miner's order, went under it, when it fell upon him, breaking his neck, and killing him instantly.

ACCIDENT No. 32.—Michael Quinn, a laborer, working for James and Michael Maehan, at the Stark shaft, Pleasant Valley, was fatally injured, November 5th, by a fall of rock. His back was broken, and he died, December 12th, of his injuries. These miners did not take proper care to keep their chamber safe, and were to blame, in a great measure, for this accident.

ACCIDENT No. 33.—Michael Madden, a miner, at Law's shaft, Pleasant Valley, was killed, November 13th, by a fall of roof. Madden and Patrick Daley were working together as partners; they had finished their day's work, and were about to go home; but there was a piece of "checker coal" hanging from the face, which they did not consider safe, and Madden got a wedge to force it down. But he had struck only three or four blows on the wedge, when Daley saw the rock breaking over his head, and cried out: "Run, Madden, for the roof is falling!" In running away, Madden ran against a prop, and fell back, under the falling roof, which

caught him, and fractured his skull. The roof in this chamber was bad, and was not as well timbered as it should have been. It was very wet, and the water made it very much worse. The chamber was thirty feet wide, and had only one row of props on each side of the road to sustain the roof; and the nearest prop to the face, on the right hand side of the road, was fourteen feet away, and the nearest prop to the face, on the left, was seventeen feet away.

Accidents Nos. 35 and 36.—George Batt and James Johnson, miner and laborer, working together at No. 2, Diamond shaft, were instantly killed, November 17th, by a fall of roof. In this case, there was a slant in the roof, running to a thin edge, which extended a little to the right of the road. A row of props had been put in on the right of the road, under this thin edge, where any experienced and careful miner would have known, at a glance, that it was too weak to bear the weight of the rock which spanned the road, and, consequently, that those props, for the purpose of holding up that slant, were of very little use. I hold that they were deceptive, and worse than if there had been none at all there. On the other side of the road, another row of props had been stood, under the thick part of the slant, but they had not been put in soon enough, for the rock had opened and parted from the solid over it, some three inches, before the props had been put in. Two of these props had been knocked out by a blast, which was too heavily charged with powder; and the two men rushed in to re-stand these props, trusting to the treacherous props on the right of the road, when the weight of the rock discharged them, and some more with them, and the rock fell, killing both men instantly. David Mosier, the mine boss, had not been in the chamber for two days, and I could not satisfy myself that he had done his duty faithfully, under the law. I did not feel like taking the responsibility, however, of determining where the fault rested, if fault there was, in the premises; and I requested Alderman R. K. Cranfield to hold an inquest, which was accordingly done. The jury failed to agree, however, and its findings, therefore, was not as satisfactory as could be wished. The evidence, in part, has been suppressed, but that which was admitted by the acting coroner, and the verdict of the jury, is as follows:

The Inquest.

A jury being impanneled, consisting of Nicholas Washburne, (foreman,) John Wagner, Esdras Howells, B. F. Ackerly, and Thomas Barrow, with R. K. Cranfield, (alderman,) acting coroner, an inquest was held, at Alderman Cranfield's office, Hyde Park, November 20th, 1877.

Benjamin Humphries, sworn: I live in Hyde Park; am a miner, and work in the Diamond shaft, where James Johnson and George Batt were killed. The accident took place on Saturday morning, November 17th, 1877, about ten o'clock. I was at work in my own chamber that morning, which is the next chamber to where the men were killed, and I heard the roof coming down. My laborer's name is Hugh Hart. He was running

a car down at the time, and was not near enough to hear the fall. When I heard it, I went into the chamber where the accident occurred as fast as I could go, and when I reached there I saw the roof had fallen and that the men were under it. I then called for assistance and Michael Larkin was the first man to respond, and he was followed immediately by William Morgan and several others. We pried up the rock which had fallen, and found that the men were then dead. I saw two or three props that were blown out by a blast which had been fired about five minutes before the roof fell. I had not been in the chamber where the accident occurred during that day, but I had been there on the evening before. I knew from their appearance that some of the props had been knocked out by the blast. There might have been four props knocked down by the blast; I can't say how far the first prop was from the face—it was pretty near; can't say how close the props were; saw props on both sides of the road; we put in some props to secure the roof while we were working to take the men out from under the rock. I believe, from the appearance of the way the men were when we found them, that they were putting up props that had been knocked out by the blast. I saw some props under the fallen roof, but don't know how many. On the evening before the accident, from what I saw, I think there were sufficient props for safety. I can't say what number of props were on the right side of the road, but I know there were some on both sides; saw props on the ground; the props and two men were under the stone; think George Batt had hold of a prop. I cannot tell whether the props were under the thin edge of the rock; they might be discharged if placed under the thin edge, by the weight of the rock; did not notice which way the head of the prop nearest the face laid; there was one or two props standing on the right of the rock after the accident; as far as I can recollect, we stood three props to secure the roof while we were working to get out the men; think I could keep up the rock which fell without putting props in the center of the road; we got those three props which we stood along the road; don't know if any props were taken out from under the rock at the time the men were taken out; I left before the two bodies were taken out. I was there when some of the props were stood and helped to stand some of them; one we stood in the middle of the road, the other two on the left hand side of the road; don't remember whether we stood two props alongside of one another; one had no cap-piece on it; did not notice the distance between the props; I consider props from four to six feet apart sufficient. The two props which we stood on the left hand side of the road we found alongside the track.

his
BENJAMIN × HUMPHRIES.
mark.

Michael Larkin, sworn: I live in Hyde Park; am a miner, and work in the Diamond shaft, where George Batt and James Johnson were killed. The accident took place on Saturday, November 17th, 1877, about ten o'clock

in the morning. I work in the next chamber to the right of the one where the men were killed. I heard the fall of roof, and called to the men but got no answer, and I then went into the chamber where the accident occurred; met Benjamin Humphries, and when I went forward I saw the fall, and I could see one of the men under the fall. I heard a shot fired five or six minutes before I heard the roof fall; it looked as if some props had been blown out by the blast; can't say how many; there were some props under the fallen rock; had not been in the chamber for some time previous to the accident; I did not help stand any of the props to keep up the roof; was doing something else; can't say how many props were stood; I did not help to take out either of the men, but saw them after they were taken out, and am sure they were dead; I was loading a car when I heard the fall; I saw Henry Williams, Samuel Evans, Charles Gallagher, and several others there helping to take out the bodies; saw Benjamin Humphries there.

Michael Larkin.

William D. Morgan, sworn: I reside in Hyde Park; am a miner, and work in the Diamond shaft, where George Batt and James Johnson were killed; the accident happened about 10, A. M., Saturday, November 17th, 1877; I work in the second chamber, inside of the one where the accident happened; Michael Harrison, my laborer, told me of the accident, and I went immediately to the chamber, and found that the roof had fallen, and helped to get the men out; did not see any props under the fallen rock; did not look under it; I helped to stand two props to hold up the roof while the men were getting out the bodies; we stood the props to the left of the road; the props I helped to set, were found lying alongside the fallen stone; don't know whether they had been used before or not; I think the fall was caused by some of the props having been knocked out by a blast; I helped to block up the rock; worked at the lower end of it; could not see under it; did not see any props lying down on the road below the fall; I stayed there until they got the men out; did not notice a prop lying on top of the fallen rock; do not know whether a blast had been fired just before the fall; did not hear any; do not know the thickness of the rock; cannot give the area of its surface; I think it was bad roof; it may be a foot thick; don't think it needs a very large prop to hold it; think there were good props in there; was not in Batt's chamber on the morning of the accident; don't know the condition of the chamber that morning; have not been near the face of the chamber lately; both men were dead when they were taken out from under the rock.

his
William D. × Morgans.
mark.

John Davies, sworn: I reside in Hyde Park; am a driver, and work at the Diamond shaft, the same place where Johnson and Batt were killed; I was on the gangway road when the accident occurred; Michael Gallagher told me of the accident, and I then went up to where the accident happened;

saw the fallen rock, and men working, trying to get out the men from underneath; I was in the chamber that morning to take in a car; I took the car up to where the men were working; I was there when the bodies were taken out from under the stone; I saw Johnson's body when it laid under the rock, but I did not see Batt's body until after it was taken out; I did not help to set up any of the props, and do not know how many props were set up; heard Johnson say there were plenty of props under the roof; don't know whether a blast had been fired there that morning or not; I brought in two cars to them that morning; I did not see either of the men drill a hole that day; they were in the habit of knocking out props; there were props on both sides of the road; David James drew Johnson's body out from under the rock; I did not notice who was working to get out the bodies; I saw Benjamin Humphreys and William D. Morgans there, but do not know what they were doing.

his
JOHN × DAVIES.
mark.

David Mosier, sworn: I live in Hyde Park; am inside foreman in the Diamond shaft, the same place where James Johnson and George Batt were killed; the accident happened on Saturday, November 17, 1877; I cannot say at what hour, as I was not in the mines at the time; the driver boss came to my house and told my wife that two men were killed in the mines, and my wife sent for me, and found me; I went to the air shaft, got a lamp, and went down into the chamber, but found no one there, as every one had gone; I was in the chamber on the Thursday before the accident, about twelve or one o'clock; at that time I considered that there was a sufficient number of props there to support the roof; I never heard them say that they were afraid of the roof; I cannot tell how many props were standing on the right hand side of the road, but I am certain that there were two; cannot tell how the accident occurred; do not think the roof would have fallen if the props were under it; think the props must have been displaced, but I don't know how; it may have been by a blast, or by being discharged by the weight of the rock; was not aware that they were in the habit of knocking out props with the shots; I did not examine the roof of the chamber the last time I was in it, but I sounded it with a cane I have for the purpose, with an iron knob on the top of it; I did not consider the roof of the chamber as being particularly bad, it was about the average; did not notice the props were rotten; examined the roof one day and told the miner he wanted more props stood, and I went in the next day and found that he had put in some props as I had ordered; there is no rule that I know of compelling men to take poor props; and I have heard no complaints about men not being able to get good props; the outer edge of the slant is from four to six inches in thickness; did not observe that it ran out to a feathered edge; knew it was thinner on one side than the other, but did not think that it ran out to nothing; don't suppose that a man could tell the thickness, the props being put in so close

—he might after a while; it would show it was thin by rapping it; two props, I believe, were discharged by the weight of the roof; the chamber down the road, I think, is sufficiently propped; do not think a few more props would make me feel any more secure walking through it; I suppose it was my duty to be at the mines that day; I don't go to every working place each day as a rule; do not think it is necessary for the mine boss to visit the chambers every day to live up to the eighth section of the mine ventilation law; a miner will advance from two to four yards a week in a chamber; it depends on the thickness of the coal; I went into the chamber on the day of the accident at a quarter to one o'clock; the men who were killed did not complain about the roof; it is the business of the mine boss to see to it.

David W. Mosier.

Thomas D. Davies, sworn: I reside in Hyde Park; my occupation is general assistant mine superintendent; I went into the mines where the accident occurred on Saturday afternoon, November 17, 1877; heard of the accident about half past twelve on that day, and being anxious to learn all the particulars, I went to the Diamond mines and there I met mine inspector Jones, and as he wanted to go into the mines to see the place, I volunteered to go in with him; I went to the place and examined it, and I think that the cause of the fall was from the blowing out of the props; but I do not think that all the props that were discharged were blasted out; I believe that if two of the props were knocked out on the left hand side of the road, from under the heaviest part of the roof that the props on the right hand side of the road would be discharged by the falling of the roof; the inside prop on the left hand side might have been knocked out by a blast, or it might have been knocked out by the fall of the rock, and by the appearance of it, the probability is that the falling of the roof discharged it; I presume that, had the roof been carefully examined, it would have been found thin, but it sometimes deceives; I suppose under the mine ventilation act, that the mine boss ought to carefully examine the roof as the miners advance in their chamber; I did not examine the roof of the chamber all the way down the road; found some of it a little heavy; do not consider it dangerous, but a few more props would not hurt it, it would be safer with more props; but I do not think that I would advise putting in more props; I cannot tell how many props were discharged by the roof, but I judge from the marks, there must have been three or four; the prop I saw under the rock I consider too small; did not notice the prop nearest the face; saw some props that, according to my judgment, were stood after the roof fell; think there were three; do not recollect seeing any prop between the two on the left; do not know the distance between the props, but they were thick; made the remark that it was well propped on one side; the distance filled up by the two fresh props was ten or twelve feet; the company always provides good props for the mines; it is part of my business to see that props are on the ground; no orders have ever been

given by me, or by any one to my knowledge, about miners using up bad prop timber; but it is too often the case that men in picking the props will select the lightest, and they often have to be looked after about it; there is plenty of prop timber at the mines; on the right side of the track, five props would have been sufficient.

THOMAS D. DAVIES.

William S. Jones, sworn: I reside in Hyde Park; my occupation is inspector of coal mines; I was not officially notified of the accident until my arrival at the mines; heard of the accident while at Jermyn's Green Ridge shaft, at about twelve o'clock and fifteen minutes; I drove home, and immediately after dinner I went to the Diamond mines' office; I there found Mr. Benjamin Hughes, general mine superintendent, and shortly thereafter Mr. Thomas D. Davies arrived there; I informed them that I desired to go into the mines to see the place where Johnson and Batt were killed, and Mr. Davies went with me; we went together down the shaft, and into the chamber where the accident occurred, and when we got there we looked to see if there were any indications as to where the men laid, and in looking under the rock which had fallen, we found the brains of one them scattered there; could not see anything to indicate where the other laid; saw the rock that had fallen, having a surface area of from twelve to fifteen square yards; the rock on the thick side, on the left of the road, was one foot thick; it extended over the road eight feet, and ran out to a very thin edge; saw a prop newly put up in the middle of the road; went on top of the fallen rock under which the men were found, and examined the other props; there was a prop lying on top of the rock, and one prop lying under the rock; this was a small one, and worthless; to the left there were two props showing indications that they had been put in after the fall; there was another prop lying there; the inside prop on the left of the road was lying on the coal, and part of it under the fallen rock; it leaned towards the face; it may have been discharged by a blast, but I think it was discharged by the falling of the roof; in my judgment I have doubts of there being four props standing on the right hand side of the road before the fall; have no doubt but those props were discharged by the falling of the rock, and not by the blast; after examining the fall, Mr. T. D. Davies and I came down the chamber road, and on the way I examined the roof, and found some of it rather heavy, and I called Mr. Davies' attention to it, and told him that more props were needed there; we then came out of the mine, and, when on our way, we met David W. Mosier, the mine boss, coming in; he returned with us, and we all three came to the surface.

On Wednesday, November 21, I went into the mines again, and I was confirmed in my conclusions which I had arrived at from my examination of the 17th. I measured the distance of the gap between the two props which had been filled by standing the two new props, and found it to be thirteen feet. I then came down the chamber road with Mr. Mosier and Mr. Hickey, and examined the roof by sounding it with a pick for the dis-

tance of forty yards in length and nine yards in width, and found it very heavy, and, in my opinion, needing props badly; several of the props now under it are very small, in fact, little better than no props at all.

On Tuesday, November 20, I examined the bodies of the men that were killed. I went to the former residence of George Batt, and found his body laid in ice, and all that I could see was two marks on the face, one on the left temple, and the other on the right side of the head. I believe the mark on the left temple was a fracture of the skull. As to the condition of his body, I have only the statement of those who laid it out; they say his body was all black and blue, and that his chest was crushed in. From there I went to the former residence of James Johnson; saw his body lying in a coffin; we opened the cover, and took off the coffin lid; found his head wrapped up in bandages, which we removed so that we could see; his face on the left side was crushed in; he must have been instantly killed. The sight of his head satisfied me that that fearful crush was the cause of his death.

I hardly think that the roof could have been safely held, with the road where it was, without its being cross-timbered; it is probable that a blast had been fired with too heavy a charge of powder, and that an unknown number of props were knocked out from under the heaviest part of the rock by the blast; and the roof undoubtedly discharged the remainder of the props. In my examinations of accidents, I find great carelessness on the part of miners in returning to the face of their chambers too soon after firing blasts.

William S. Jones.

The Verdict.

Commonwealth of Pennsylvania, } ss:
County of Luzerne, Scranton City, }

An inquisition indited and taken at the city of Scranton, in the county of Luzerne, and State of Pennsylvania, the 20th day of November, A. D. 1877, before me, R. K. Cranfield, an alderman in and for said county, upon view of the bodies of James Johnson and George Batt, then and there lying dead, upon the oath of Nicholas Washburne, James B. Hickey, B. F. Ackerly, John Wagner, Thomas Barrow, and Esdras Howell, good and lawful men of the county aforesaid; who, being duly sworn to inquire on the part of the Commonwealth, when, where, and how, and after what manner, the said James Johnson and George Batt came to their death, do say that, on the 17th day of November, A. D. 1877, at the city of Scranton, and in the county aforesaid, by a fall of roof in the Diamond vein of the Diamond shaft, caused by a shot, which knocked out the supporting props, and that they went back too soon, the roof falling on them and killing them; said mine or shaft belonging to and worked by the Delaware, Lackawanna and Western Railroad Company. We, the undersigned jurors, find that James Johnson and George Batt came to their death, on the morning of November 17, 1877, by a fall of roof in the Diamond vein, in the Dia-

mond shaft, caused by a shot, which knocked out the supporting props, and that they went back too soon, the roof falling in on them and killing them; said Diamond shaft worked by the Delaware, Lackawanna and Western Railroad Company.

In witness whereof, as well the aforesaid alderman, as the jurors aforesaid, have to this inquisition put their hands and seals, this 22d day of November, A. D. 1877.

R. K. CRANFIELD, (*Alderman,*)
Acting Coroner.
NICHOLAS WASHBURNE,
Foreman.
JOHN WAGNER,
ESDRAS HOWELLS,
B. F. ACKERLY,
THOMAS BARROW,
Jurors.

A Minority Verdict.

I, the undersigned, cannot agree to the above verdict, but find that James Johnson and George Batt came to their deaths on the morning of November 17, 1877, by a fall of roof in the Diamond vein of the Diamond shaft, caused by the neglect of the mine boss, David W. Mosier, in not having seen that the roof was properly timbered, as by law required; and I further say, that his employers, the Delaware, Lackawanna and Western Railroad Company, are to blame for imposing on him duties that no man is able to perform.

JAMES B. HICKEY.

As I have before intimated, some of the most damaging evidence against D. W. Mosier, the mine boss, was not taken down by the acting coroner. When giving an account of where he was when the accident occurred, he said he "was on the mountain." I asked him "upon what mountain?" But he at first objected to answer, saying that he did not think he was obliged to account to me where he was, but he finally answered "that if I must know, he was on the mountain back of the Briggs shaft." I had been informed that he was on the mountain hunting, and if it was not so, I desired to give him an opportunity to account for himself, but he did not avail himself of it.

I am of the firm opinion that the first clause in Mr. Hickey's verdict is the correct one, but where he got one particle of evidence in any way to criminate the company, is to me a profound mystery. Mr. Mosier has not a large territory under his charge, and he can travel over it every day and have plenty of time to examine the working places as he passes through them. I know of no other duties imposed on him by the company, and these certainly are not "such as no man can perform."

The truth is that if the proper care had been taken to stand the props

on the right side of the road under a solid part of the slant, or if cross-timbers had been put in, the roof would not have fallen, though a couple props had been knocked out by a blast; and it was the mine boss' business, as Mr. Davies admits in his evidence, and as the law plainly states, to carefully examine the roof, and to see that it was properly timbered. I am very sorry to say that it has not been shown that Mr. Mosier did do this, and I must agree with James B. Hickey that he was to blame for neglecting to do it. I say this with the kindest feelings towards Mr. Mosier.

Accident No. 38.—Michael Howard, a miner, at the Coal Brook tunnel, Carbondale, was instantly killed, December 1st, by a fall of roof. He had been trying to draw down the dangerous slab, but used a drill instead of a crowbar for that purpose, and as is always the case, he was afraid to break or bend his drill, and did not exert his strength to bar it down. Several years ago, he was seriously injured by a fall of roof before, and a son, who was working with him at the time, was instantly killed by his side. However, it may have been then, it is beyond a doubt that he was killed now, through his own negligence entirely. The using of a drill instead of a crowbar to bar down rock is reckless in the extreme, and ought never to be permitted. Every miner should be compelled to provide himself with a good strong crowbar.

Accident No. 39.—Patrick Smith, a laborer, working for Patrick and Lewis Doran, at No. 12 shaft, Pleasant Valley, was instantly killed, December 4th, by a fall of top coal. In this place there is a strong seam of rock between the bottom and top coal, and a blast had been fired right over the rock to break it down, which left only the top coal hanging. Patrick Doran, one of the miners, then barred all that he thought was loose down, but knowing there was a slip running behind the overhanging top coal, he informed the laborer that he would put a blast in it to bring it all down; but one of the laborers advised him not to do so until all the rock was cleared away. The miner, however, did drill a hole, and had tamped it ready to fire, and Smith, in the meantime, was under the top coal throwing the rock back into the gob; but just as Doran had finished preparing the blast, he heard the coal cracking, and cried: "Look out," but Smith, who was hard of hearing, only straightened himself without moving away, when the whole mass of coal fell upon him, completely burying him, fracturing his skull, and killing him instantly. He leaves a widow with seven small children.

Non-Fatal Accidents from Falls of Roof and Coal.

The non-fatal accidents from "falls of roof" and "falls of coal" are so numerous that time will not permit me to notice each one separately. There were sixty-four of these accidents, over one half of which were comparatively slight, and it is safe to say that nearly all of them resulted from sheer negligence and reckless carelessness. As I have already intimated,

the inspector can do but very little to avert accidents from this cause, and the individual operator and corporations are as helpless as the inspector, only in the matter of compelling their mine bosses to do their duty in relation to propping. The men themselves are the parties to attend to this matter above all others. We sorely need better discipline, and I would hail the day when every colliery shall have a code of rigid rules which shall have equal force with the mine law itself. In England, the "mine regulation act" provides for such rules, and I now have copies before me, and I believe that such a set of rules would do great good in our collieries, and I most earnestly commit the subject to the consideration of our law-makers.

Crushed by Mine Cars.

There was only one fatal accident from this cause during the year; but the non-fatal ones numbered thirty-eight. There can be no excuse for the frequency of accidents from this cause. Drivers and runners are the principal sufferers, and in most cases they bring the suffering upon themselves. They get into a rage at their mules, and beat them until they get so mulish as to be utterly unmanageable, and, in their attempts to control them, they are frequently thrown under the cars, and are seriously injured. Several boys have lost limbs in this way during the year, and escaped with their lives only as by a miracle. Several men have been injured by mine cars also, in trying to pass them on the wrong side, and in narrow places on the main roads, and by riding on them. As a rule there is ample room to pass cars at all the collieries on the one side or the other of the road, and if men will only use their common sense they need not be caught. I have found some places where drivers and runners had to run to sprag their cars, where the pillars were too close, and I have caused skips to be taken from the pillars to give them the necessary room. Mine bosses in many collieries do not keep the roadsides clear enough from rubbish, bony, rock, &c., and the boys stumble over them, and often fall under the cars. Such collieries are in a dirty, slouchy condition, and the mine bosses in charge are generally of the same character.

ACCIDENT No. 22.—James Owens, a door boy in Jermyn's slope, Jermyn, was instantly killed July 2d, by a trip of loaded cars on a self-acting plane. The little fellow was going to his work in the morning, and was walking up the plane upon the wrong side of the track, and when thirty yards from the foot of the plane, the loaded trip came down upon him, knocking him down, and mangling his body in the most shocking manner, and carrying it down to the foot of the plane. His head was nearly severed from his body, one arm was entirely cut off, and every bone in his body seemed to be broken. There are so many accidents occurring on the slopes and planes in this manner, that I am forced to express the opinion that no one should be allowed to travel on them while they are working. A traveling way ought to be provided parallel with them, and this could be done in almost

every case with very little trouble; but, whatever the trouble may be, a safe way should be provided for traveling.

Explosions of Powder and Premature Blasts.

Accident No. 13.—James Orr, a miner, at No. 6 slope, Pittston, was fatally injured, April 28th, so that he died, May 1st, by a premature explosion of a blast. He was in the act of lighting the match to fire a blast, when, by touching it, the squib ran out into the flame of his lamp, setting it off, and setting the blast off, instantly. This was done so quickly that he barely had time to turn around. He was struck in the left thigh, fracturing the thigh bone and severely lacerating the flesh. The shock brought on congestion of the brain, which resulted in his death; and after his death, it was found that he was seriously, if not fatally, injured otherwise, and that this had been overlooked and neglected. This was the only fatal accident from premature blasts. No one, to my knowledge, was killed by explosion of powder.

The non-fatal accidents from these causes during the year numbered thirteen—seven from explosions of powder, and six from premature blasts. The whole number were inevitable results of the most criminal carelessness. Take accident No. 154, in table No. 2, for an example. This man, it is said, after setting fire to the match, ran to a place of safety, and waited for a short time for the blast to explode; but as it did not explode as soon as he expected, he returned to it, and found the match still burning, though there was no flame. He then stooped and commenced blowing upon the match, and the blast exploded, injuring him very severely. A man that will do such a foolhardy act as this is fit for no place but a lunatic asylum.

Blasting through Pillars.

Accident No. 30.—John Roberts, a door boy at the Seneca slope, Pittston, was instantly killed, October 3d, by a blast through a pillar, which was fired by Dennis Sloyn. His chamber was within less than two yards of being through to a gangway which ran at right angle with it. When ready to fire a blast, Sloyn sent his laborer, Robert Drummond, to warn all on the gangway that he was about to fire. The laborer went through an entrance into the next chamber, which was holed through to said gangway, but instead of going up that chamber to the gangway, where he could see that all was safe, he cried, "Fire!" from where he stood, and some one, who was passing on the gangway, answered, "All right; fire away." Drummond then told Sloyn to fire, which he did. The blast was fired, and broke through the pillar, and the little boy, being at his door directly opposite, and only five yards from where the blast broke through the pillar, and in the act of either opening or closing his door, was instantly killed thereby.

The warning given was no warning in such a place and under such circumstances. The laborer should have posted himself where he could see that no one should pass on that gangway, and he should have remained

there as a sentinel until the blast was fired. The gangway was a main traveling way, and the drivers and other persons were continually passing that way, and were liable to be murdered as little John Roberts was. The laborer said when I examined him that he "*thought* it was John Roberts who answered" him, but I contend that he had no business to act on a mere supposition in such a case. He should have been ABSOLUTELY CERTAIN that everything was safe, no matter what trouble it was necessary to go to in order to gain that certainty. But in this case it would have been no trouble. He had only to walk twelve yards to reach a position on the gangway, where he could have seen the door and the main road past the place where the blast was fired. He would then be ten yards away from where the blast broke through the pillar, and would have been in a place of perfect safety.

Two criminal errors were committed in this sad case. First. Sloyn had not properly sought to know how near through his drill hole was before he charged it; secondly. Robert Drummond ought to have gone to the entrance to the gangway, where he could have *seen* that the boy and everybody else had gone to a place of safety before he gave the word to fire. They had been frequently and repeatedly warned by Thomas Smiles, the mine boss, to give proper warning when about to fire blasts, and I had also issued a circular, to be read to all miners, bearing upon this subject—a copy of which will be found on another page. Still, notwithstanding all we may say or do, men will persist in firing away, caring nothing, apparently, who they may kill by their reckless acts, and there seems to be no way to bring them to account for their crime.

Non-fatal Accidents by Blasts through Pillars.

Three men were severely injured by blasts being fired through pillars, in addition to the above fatal case. Thomas Sharp and James Leonard, laborers, at the Meadow Brook shaft, Scranton, had a very narrow escape from instant death, December 4th, from a blast fired in a cross-heading, through a pillar, by John Cotswinker. The miner, in this case, had ordered his laborer, John Iden, to go to a lower entrance, and tell the men working in the other chamber, that he was about to fire; but he did not give Iden time enough to go, but set fire to his match, and ran down the road after him, and was in the lower entrance as soon as he was. Iden cried, "fire!" But before the men had time to go a half dozen yards, and just as they were opposite where the blast was, it exploded, breaking through the pillar, and knocking both men senseless, injuring them about their heads and bodies seriously. Fortunately, they have both recovered. Every one can see that this was no proper warning.

On the same day, at the Capouse shaft, Hyde Park, John Leyshon, a miner, who was at his box, making a cartridge, was severely injured by a blast fired through a pillar by Henry Morgan. In this case, there was no warning of any kind given. The miner and laborer both admit that they had given no kind of a warning.

Now, I contend that none of these are accidents, for every one of them could have been prevented by the simple act of taking a few steps, and making proper use of that ever active member—the tongue. It is so strange that men will not stop a moment to *think*, and act like rational beings. If they would *think*, it cannot be possible but they would act differently.

Fatal Accidents on the Surface.

Accident No. 10.—Frederick Wilhelm, a culm man, at the Bellevue breaker, was instantly killed, April 3d, by the box of a culm car tipping back upon him, crushing him between the box and the railing of the trestle leading from the breaker to the culm tip. He had tipped the box to dump its contents, and neglected to put a stay under it, and when the culm ran out from the front, the box fell back, with the above sad result.

Accident No. 31.—Edward Calahan, a slate picker, at the Fair Lawn breaker, was killed October 13th, by being smothered in a culm pocket. The boy was not doing his proper work, but had exchanged work with another boy named Martin Kennedy, without the knowledge of the breaker boss. The breaker had been idle for some minutes on account of one of the platemen dropping his pick through the bars and breaker into the screens. Calahan was right over the culm pocket, which was too full, and was shoveling culm back so that it would not run over into the pea coal chute. It is a mystery how the boy was drawn into the pocket. The probability is that he laid on the culm and fell asleep while the breaker was lying idle, and that when the culm was drawn from the pocket, he was drawn in while asleep; or it may be possible that he had a fit, and was unable to help himself. He did not cry for help, and no one knew of his being in the pocket until he was drawn through, at the bottom, by the culm man.

Accident No. 40.—Richard Joyce, a miner, at the Greenwood colliery, Lackawanna township, was fatally injured, December 17th, by falling under cars, on a plane, at the breaker. He jumped on the cars for the purpose of riding to the top, but when the cars started he fell under them, breaking his arm and injuring his back so severely that he died on the 22nd, at the Lackawanna Hospital, Scranton. He had no business on those cars, but by their being empty, he claimed that he was not violating the law.

Non-Fatal Accidents on the Surface.

The non-fatal accidents on the surface during the year numbered eleven—four by being kicked, or thrown, by mules; three by being caught in screens; three by being run over by cars, and one by falling out of breaker. The last one:

Accident No. 41.—Henry Thomas had a very narrow escape with his life. He fell the distance of thirty-five feet through the frame of the Capouse breaker, Hyde Park, striking on a pile of waste iron. His whole system was fearfully shocked, and one leg broken, and no one at the time thought it possible for him to live, but to the surprise of all he finally re-

covered. He had no business whatever to go to the place from whence he fell.

ACCIDENT No. 112.—Edward Simons, a slate-picker, at the Mt. Pleasant breaker, Hyde Park, had his knee fearfully crushed, November 14th, by slipping into the screen. His life was despaired of for a long time, but he was finally saved by amputation of the injured limb, which leaves the little fellow a cripple for life.

ACCIDENT No. 151.—Sarah Conway, a widow, was run over by big cars, at the Diamond breaker, December 22d, while picking coal for her own domestic use, and her nether limbs were mangled in a most shocking manner. She was conveyed to the Lackawanna Hospital, where she had to undergo amputation of both limbs. She was living when I last heard from her. I hardly think it fair to charge such an accident to the business of mining coal.

Explosions of Carbureted Hydrogen Gas.

The accidents from explosions of carbureted hydrogen gas, for 1877, have been comparatively light and few in number. I had strong hopes that I would have no fatal accident from this cause to report, but I am very sorry to say that I have been disappointed. However, there is only one, and that one was not from burning, but from being violently thrown by the concussion of an explosion. This matter ought to be under the absolute control of the mine bosses, and no reason can be advanced, excepting the incompetency of the mine bosses and stinginess of operators, why it is not. If an adequate amount of pure air is circulated through to the face of each and every working-place in the mine, to dilute the gas and carry it off as the law requires, there need be no casualties from explosions of gas. But it is almost impossible to induce the managers of many of our mines to provide enough air for this purpose; and many of them, even when they have the amount required, do not utilize it by conducting it properly through the workings. There are many bosses who do not know how to carry air with them, and these men are generally so full of conceit that they will never learn. Though they know literally nothing about the properties of gases and the laws governing ventilation, no one can teach them anything. Go into the collieries in charge of this class, and you will find no air-ways ever driven with their gangways; their stoppings are built of culm and rickety brattice; they have doors enough for a half dozen collieries; and they have a little pigmy of a grate which they dub with the name of "furnace," at the bottom of a forty to sixty feet shaft, to produce their ventilation. When one of this class is put in charge of a colliery generating explosive gas, explosions are the inevitable consequences. Air-ways are absolute necessities in such collieries, and culm stoppings and rickety brattice will not answer. Good strong walls, well pointed or plastered with mortar, must be provided before the air-currents can be well kept under control. The companies are too often "penny wise and pound foolish," or too miserly, to furnish a little lime

and sand for this purpose, and their workmen are left exposed to danger and death for the want of them. When the inspector demands this from their hands, they meet him with the assertion that they cannot afford it, and that they are striving to keep their works moving on the sole maxim of "live and let live," out of compassion for their workmen, forsooth! But this is not the principle that governs them; they want to "live," but do not care a straw whether any one else lives or not, or they would provide enough of God's free air for their workmen to live on.

The inexcusable custom of slacking up the speed of fans and dampening furnaces during the night, I have peremptorily stopped, and now it is never done to my knowledge. It was the general custom to do this throughout this district until about one year ago, and the result was that the fire bosses, in going their rounds in the mornings, would find large and numerous lodgments of gas in the face of the workings, which could not be broken up and dispelled without resorting to the objectionable and generally unnecessary custom of "brushing out the gas." I have also put a stop to the custom of sending the workmen to "brush out the gas." This work, if done at all, I insist must be done by the mine boss, or his assistants, "before the miners shall enter the mines."

In 1876, there were six fatal and twenty-one non-fatal accidents from explosions of carbureted hydrogen gas. In 1877, one person killed and twenty-three persons injured through explosions of gas; and out of the latter, sixteen persons were injured by four explosions. The fatal accident from this cause, during last year, occurred November 15th, at Jermyn's Green Ridge shaft, Scranton, and is—

Accident No. 34.—Anthony Collins, a young man, working at company work in the above named shaft, had his skull fractured by being thrown against a pillar by concussion of an explosion of gas, which demands particular notice. In order to place the blame for this explosion where it properly belongs, it is necessary to explain all the circumstances relative to the ventilation of the colliery.

There is considerable inflammable gas evolved in it, consisting of powerful feeders or "blowers." These blowers were frequently ignited by the firing of blasts, and the class of men who were employed there as miners were utterly incompetent to control those fires, and would often run away, allowing the fires to extend to the gobs, burning out the props, and causing the roof to fall. Several chambers had been closed in this manner, as will be seen by the accompanying map. July 23d, I visited the shaft, having heard that it was then on fire. It had been burning for several days, but the men in charge had it under control, and did not need my assistance. October 18th, they had another fire there, and I went there again, and upon that occasion I visited about half the workings, in company with Samuel Baker, who was at that time the mine boss. On Saturday night, the 20th, two men were injured by a fall of roof, while engaged extinguishing the fire; and on the following Monday morning, as soon as I heard of the ac-

cident, I hastened thither, and descended at once to the scene of the fire, where I found a number of men working towards the fire, and exposed to unnecessary danger from falling of roof, which was being melted by the fire. I at once ordered the men to stand a number of props, and ordered Baker, the mine boss, to see that the men secured the roof well as they advanced towards the fire. I measured the air just inside of the fire on this occasion, and found only 7,470 cubic feet per minute. On the 29th of October, I went there again, and found that the fire had been extinguished, and I finished my examination of the workings and the system of ventilation for the colliery.

I found only one door on the entrance to the east heading, where there should have been two for use, and an extra one for emergencies. That door was near the foot of the shaft, and is marked "A" on the accompanying map, and there was another door between the air-way and gangway at B. Now, it will be seen at a glance that, when either of these doors were open, as they must be a great portion of the time for the coal, &c., from that gangway to pass through, the air was almost entirely cut off from the workings of that heading, and would take the course indicated by the red line on the map, to the upcast at C.

Another single door was located on the head of the slope at D, which was a division door between two currents—one entering down the main shaft and intended for the east heading, and the other entering through the second opening and ventilating the workings on the right and left of the slope, as indicated by the red line on the map of that section. This current came up the slope to the door at D, which was intended to turn it to the west of the shaft, and thence to the upcast at C.

When there, on the 29th of October, I ordered Samuel Baker, the mine boss, to put in double doors at each of these places, and I supposed it would be done immediately. I also wrote a letter to John Jermyn, Esquire, informing him that they had not over half the amount of ventilation in the east heading that was needed. But when the explosion occurred, on the 15th of November, I found that my orders had been entirely ignored. Nothing had been done. And notwithstanding that Samuel Baker knew he was violating the law by thus neglecting to provide double doors where I had ordered them, he chose to take the risk. When I assert that he *knew* he was violating the law, I make the assertion because I had informed him that the law required double doors in those places, and that it was very important that they should be put in immediately, because the mine was generating so much gas. I was satisfied that he knew but little of his own knowledge about working a colliery and carrying on ventilation, and I so informed Mr. Jermyn. About nine days before the explosion, Mr. Jermyn had dismissed Baker, and had employed another mine boss, in the person of one David Birtley. He also professed to know that the law required double doors in the places referred to, but did no more than his predecessor to have them put in, though he had been in charge for over

Map of
JOHN JERMYN'S MINES,
Green Ridge,
SCRANTON, PA.

Showing Methods of Working and Ventilating at time of, and after Explosion, November 15. 1877.

W. S. Jones, Inspector of Mines.

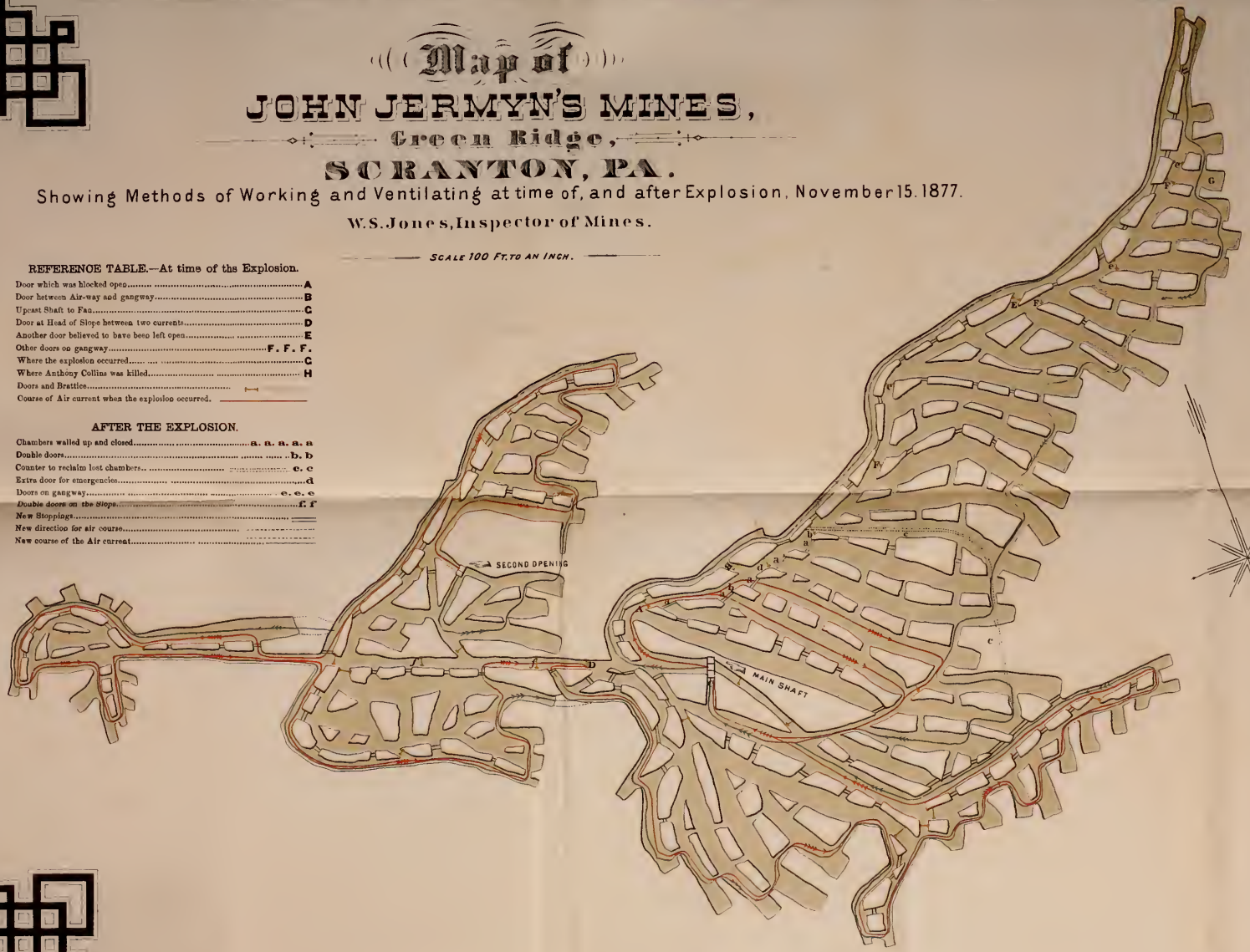
SCALE 100 FT. TO AN INCH.

REFERENCE TABLE.—At time of the Explosion.

Door which was blocked open	A
Door between Air-way and gangway	B
Upcast Shaft to Fan	C
Door at Head of Slope between two currents	D
Another door believed to have been left open	E
Other doors on gangway	F. F. F.
Where the explosion occurred	C
Where Anthony Collins was killed	H
Doors and Brattice	⊢
Course of Air current when the explosion occurred.	———

AFTER THE EXPLOSION.

Chambers walled up and closed	a. a. a. a. a
Double doors	b. b
Counter to reclaim lost chambers	c. c
Extra door for emergencies	d
Doors on gangway	e. e. e
Double doors on the Slope	f. f
New Stoppings	═══
New direction for air course	- - - - -
New course of the Air current	═══



a week. This much is necessary to understand the condition of the mines at the time of the explosion.

The examination into the immediate cause of the explosion developed the following facts: The explosion occurred about ten o'clock, A. M., and was caused by the door at A being blocked open by a trip of loaded cars which were left standing in it by Michael Duffy, a runner, whose business it was to see that the cars passed through the door so that it might be closed. Instead of doing his duty in this respect, he ordered Edward Anguin, the little door boy, to go and tell the footmen to take the cars away. The boy did as he was told, and went five or six times to call on the footmen to take the trip out of the door so that he might close it. But his calls were unheeded, and the door was kept open in this manner for from twenty to thirty minutes, cutting the air from the heading and giving it the short and more direct course through the outside chambers to the upcast, as shown by the red lines on the map already referred to. There was another door at E, which was open also, as is evident from the fact that it was not destroyed by the concussion of the explosion, when the stoppings between the airway and heading were blown down even outside of it, as well as the doors at F F F. The little door boy, Anguin, seemed to be the only person who did his duty, but he could do nothing but repeatedly call for some one to take the cars out of the door; that was something that the little fellow could not do, nor was it his business to do it.

There was room for only about nine cars to stand outside of the door, between it and the foot of the shaft, and it was proven beyond the shadow of a doubt that this door had been blocked open many times before in the same manner, though not for so long a time, perhaps.

The explosion occurred in Maux Phillips' chamber, at the point G. Phillips and Gotlieb Mondt, his laborer, were severely burned, but they were the only ones burned. It is not positively known how the gas was ignited. Phillips and Mondt deny all knowledge of firing it, and it is possible that they did not actually ignite it. In going through the chambers in that heading I found nails driven into the props close to the roof, and to my utter surprise, I learned that these nails were used to hang safety lamps on. They would hang a Davy lamp, lighted, on these nails and leave them there and go about their work with naked lights hanging in their boots or on the car bumpers, and they would go away out of the chamber leaving these lamps hanging there. They did not seem to have the remotest idea that a Davy lamp will explode in a couple minutes, and I suspect that this explosion may have been caused by one of those lamps exploding.

The above explains the cause of the explosion as well as I can do it without giving the voluminous testimony adduced on the investigation, which would swell this report to undue proportion.

I only desire to add that the improvements made under my direction since the explosion have increased the ventilation in the face of the east

heading workings from less than 8,000 cubic feet per minute to nearly 26,000 cubic feet. Those improvements consist of walling up the five outer chambers, as indicated by the blue stoppings at a, a, a, a, a, on the map. This gave ample room for double doors, which are located at b, b. Then the walled-up chambers are re-opened from the chamber inside of the doors, as indicated by the dotted lines at c. There is also an extra door at d, which is only to be used in case of accident to one of the others. This arrangement carries the air forward, as shown by the blue line, into the face of the heading, and through the chambers to the upcast. There are other doors at e, e, e, which, with lines of stoppings in the entrances through pillars connected with them, forces the air well on to the face of the workings.

On the slope, which inclines only $3\frac{1}{2}°$, two doors are put in at f, f, and the current ventilating the slope workings now traverses the course indicated by the blue line in that section. And there are other improvements inaugurated to split the currents into four panels, which are to be credited to John E. Evans, who Mr. Jermyn employed to take charge of the mines, after the explosion, in place of David Birtley.

The place where Anthony Collins was killed is shown at H on the map. The injured were Manx Phillips, (miner,) Gotlieb Mondt, (laborer,) Patrick Barnes, (laborer,) William Lanyon, (miner,) J. W. McPeak and Luke Burns, (drivers.)

Who were to Blame?

First. John Jermyn was, in my opinion, very much to blame in that he did not "employ a competent and practical inside overseer, to be called mining boss," in order "the better to secure the ventilation of the colliery, and provide for the health and safety of the men employed therein." (See section eighth, act March 3, 1870.) I do not hesitate for a moment to assert, in the most positive terms, that he did not have such a competent mining boss, as required by law, in the person of either Samuel Baker or David Birtley. Mr. Baker, however, is entitled to credit for the successful manner in which he managed the sinking of the two shafts, and I freely accord him the credit due him, and as a sinker I would recommend him with the greatest pleasure; but that he is not well posted enough in mining to manage a colliery successfully any expert can see by a simple glance at the map of the workings of the Jermyn Green Ridge shaft.

Secondly. Samuel Baker was to blame in that he disregarded the orders of the inspector. He had no excuse for ignorance, for that had been swept away by my instructions. And he was very much to blame in that he did not post himself in the requirements of the law, so that he could carry out its provisions.

Thirdly. David Birtley was to blame because he did not comply with the law, when, according to his own sworn testimony, he *knew* what the law required. His plea of want of time is a very lame and weak one, for

it did not require one half of a minute to see what must be done, and how to do it.

Fourthly. Michael Duffy, the runner, who left the trip of cars standing in the door, as sworn to by Edward Anguin, the door boy, and as admitted under oath by himself, was very much to blame; but he did not do anything in this case, only what he was accustomed to do; and the custom had been allowed to go on without any interference on the part of the mining boss. The custom was to send the door boy to tell the footman to take the cars out of the door.

Lastly.—William J. Davies, the fire boss, was not blameless. He was the only one who appeared to be competent on the premises. He knew things were wrong, and had called the attention of the mine boss to the needed improvements; but being subordinate to the mine boss, he was powerless to have done what was necessary. The error committed by Davies was, that he did not inform Mr. Jermyn of the fearful risk they were running by not attending to the necessary improvements. I can readily see the delicacy of such a course, and how liable his action would be to a wrong construction; how liable it would be to be attributed to jealousy and selfish motive, &c. While he knew all about the miserable system of ventilating the mine, he also knew that the law placed the responsibility on the mining boss, and that a fire boss was to be under his direction and subject to his orders. Still, when he knew that the lives of his fellow workmen, and the property of his employer were in constant danger of being destroyed, he would have done nothing disgraceful if he had gone to Mr. Jermyn and laid the whole matter before him, and, under the circumstances, it was unquestionably his duty to do so. It did not matter how Mr. Jermyn would have received him, this was his imperative duty. The press, at the time, contained strictures on Davies which were uncalled for and unjust. Davies, on the day of the explosion, did his duty and did it well, and with a competent mine boss he is unusually well qualified to make a good fire boss.

Non-fatal Accidents from Explosions of Gas.

Accident No. 6.—William Batten and John McCullough, miners, at the Leggett's Creek shaft, Providence, were very severely burned, January 18th, by an explosion of gas, while in the act of "brushing out gas" from their working places. They had gone in according to custom, after being told by the fire boss that there was gas in their chambers, and commenced brushing away, leaving their lighted miners' lamps in the return air-way. There being a large body of gas there, it soon came in contact with the lamps and an explosion of course was the inevitable result. Batten's hands were shockingly burned, leaving him a cripple the balance of his life.

They had no business to go in there until their working places had been examined, and all cause of danger should be removed; and those who sent them in, or allowed them to go in, were criminally violating the law. This practice has been stopped, however, and if any cases of this kind

should occur hereafter, I would feel constrained to have the parties brought to justice, or at least do my part towards that end.

ACCIDENTS Nos. 31 AND 127.—Both of these explosions were ignited by mine bosses. The first occurred April 10th, at No. 6 shaft, Jenkins township, where William Reynolds, mine boss, and Martin Heffron, laborer, were severely burned. Reynolds' life was for a long time despaired of, but he has finally recovered so as to be able to be at work again.

A large cave had occurred in the old workings which was endangering a main gangway, and Reynolds, taking Heffron with him, went into the old workings to examine the cave, and upon reaching its edge he climbed up on to it until he was above the level of the roof, and into the cavity of the fall. This was full of gas, which exploded with terrific force, burning the men as already stated. It was foolhardy in the extreme to venture into old workings in this manner, in a gassy region, without a safety lamp, and especially to climb upon falls, as Reynolds did. Gas is very liable to lodge in old workings in all the collieries below Archbald, in this district, and no one should venture into them without a safety lamp, though no gas was ever seen there when the section was being worked. But if men will persist in rushing into danger in this manner, they must not find fault with the public if it withholds its sympathy from them.

No. 127 occurred November 29th, at No. 10 shaft, Pittston, and William Abbott, mine boss, and John Cowan and William Mitchell, miners, were severely burned by an explosion ignited by Abbott. He went into old workings to "rap," to ascertain how near Mitchell was to breaking through a pillar. In one sense, if it were not for the burning of other parties, we might be tempted to say that bosses, in cases of this kind, deserve all the suffering they bring upon themselves. I have but very little sympathy for them. They are supposed to have superior knowledge relative to the gases found in our coal mines, and the proper way to deal with them; but it seems that some of them must be taught fiery lessons before they will post themselves as their duties require they should.

Rules for the Government of Mines.

It is unquestionably a fact that a radical reform is wanting in the discipline of our coal mines, and that a code of rules is sorely needed for that purpose; and in order that such rules shall be effective to reduce accidents, it is very evident that they must have the same force in law as the mine ventilation act itself. The mine ventilation act has done an incalculable amount of good throughout the coal regions; but in my opinion its provisions are too general and indefinite in many respects, to insure proper discipline. Hence, I submit that a supplement should be enacted authorizing the adoption of general and special rules for each colliery; or, general rules might be enacted as a supplement to the act of 1870, and make it compulsory on all operators to frame and adopt special rules for each colliery, which is the manner adopted under the "mine regulation act of

1872" in England. The general rules in said act are embodied in the fifty-first section of the act itself, and are well worthy of the consideration of our law-makers, many of whom I know feel a deep interest in the welfare of those who are employed in our coal mines. The provisions of some of those rules are in substance incorporated into our law, and there are some of them which would not apply to our mines; but there are other rules that might be framed which would be applicable in this country and wholly inapplicable in England.

I am aware that we have a certain class of men in the coal region who will cry out against any proposition of this kind, and who will declare that "we have too much law already," &c. The possibility of having too much law, I admit only in cases where the law is an unjust one, and so indefinite that it cannot be enforced, and the sole object I have in view in recommending the rules I am speaking of, is to make our present law more effective. The fifty-second, fifty-third, and fifty-fourth sections of the British act provide for special rules in the following words:

"In addition to the general rules, but not at variance with them, each mine must have its own set of special rules, framed to meet the special circumstances of the mine. The object of special rules is: First. To prevent dangerous accidents. Second. To provide for the proper discipline of those employed in the mine. Special rules have the same force as if they were contained in the act."

"How Made.—Special rules are to be prepared, in the first instance, on behalf of the owners, and are, together with a notice, to be posted up during a fortnight on the premises; such notice to be printed and to be to the effect that, at the end of the fortnight, the rules will be submitted to the inspector of mines for the district, and that, in the meantime, any person employed in the mine is entitled to forward any objection to the inspector, at his address, as stated in the notice. On the expiration of the fortnight, they are to be signed by the owner, agent, or manager, and to be transmitted to the inspector, together with a certificate that the rules and the notice have been posted as aforesaid. The Secretary of State may, within forty days, object to the special rules, if they are insufficient or unreasonable, and require them to be modified. These requisitions must be complied with, or else referred to arbitration. After forty days, special rules, if not objected to, become established, and are to be signed by the inspector of the district."

It is not necessary to adopt this mode for the framing of these rules; any other mode might be adopted, but I recommend the plan contained in the above extract as a very good one. It is painfully evident that we need some such rules for the government of our mines, and, with the sole purpose of doing all in my power to prevent accidents, on the 9th of April, I issued a circular containing the following rules, which I sent to all superintendents and mine bosses:

Rules for the Government of Mines and Miners.

RULE 1.—Engineers having charge of fans used for ventilation must keep the fans running at their regular speed during the night as during the day. The dangerous and inexcusable custom of "slacking up the speed of fans during the night" must be discontinued. By running the fans at their regular speed, as hereby required, it will in a great measure prevent the accumulation of gas in the workings during the night, and will do away with the uncalled for custom of "brushing out the gas" every morning before work is commenced.

RULE 2.—The mine boss, or his assistants, must go through the mines each day, after the day's work is finished, to see that the "air-ways are unobstructed," and that the "doors are all closed, &c.," as the law requires.

RULE 3.—The workmen must not be allowed to enter the mines generating explosive gas in the morning until the "mine boss, or his assistants," shall have "carefully examined the workings," nor until "the cause of danger, if any exist, shall be removed."

RULE 4.—The workmen under no circumstances whatever are to be allowed to enter their working places to "brush out the gas." The gas must be cleared away before they are allowed to enter, by the mine boss, or his assistants.

RULE 5.—The mine boss must, in all cases, provide an adequate amount of pure air, and conduct the same "to the face of each and every working place throughout the entire mine to dilute the gas, &c.," and to carry it off. If this is attended to the necessity of "brushing out the gas" will never exist, and it never should exist.

Handling Powder.

RULE 6.—The sale of "cartridge powder" to workmen, unless it is encased in wooden or metallic boxes, must be discontinued. Canvas bags and paper wrappings are not safe, and must not be used.

RULE 7.—The miners must provide themselves with boxes to hold their powder, &c., in the mines, said boxes to have close covers, and to be placed away from the roadsides, and no one should be allowed to approach those boxes for any purpose whatsoever with a lighted pipe, nor a lighted lamp. A place, three or four yards away from the box, should be prepared to place the lamp when the box is approached.

RULE 8.—Any miner who may be so reckless as to force a cartridge into a hole with the butt end of a drill, should be discharged at once. No careful and competent miner will ever thus court death to himself and those who may be around him.

RULE 9.—Where cross-headings or entrances are driven through pillars, the party firing a blast in such entrance must be sure to give warning to those working on the opposite side of the pillar, giving them ample time to find a place of safety, before he shall dare to fire his blast. Different

approaches to where blasts are being fired must be carefully guarded. No excuse can justify accidents from this cause.

Falls of Roof and Coal.

Rule 10.—The mine boss must insist upon the working places being properly timbered by the workmen, so as to prevent the fearful loss of life and serious accidents continually occurring from "falls of roof" and "falls of coal, &c." No excuse for neglect or carelessness in this matter will avail any one to save him from prosecution, after the promulgation of this warning.

Rule 11.—No miner should work himself, nor allow his laborer or helper to work, in any place where he *suspects* danger. His first duty, always in such cases, is to remove all cause of danger. He should draw down all overhanging rock, bone, slate, or coal, which he suspects to be dangerous; and if he fails to draw it down, he should immediately stand a temporary prop or props under it. If this simple rule is followed, many precious lives will be saved, and much suffering will be avoided; and where an accident shall hereafter occur through neglect in this matter, the party who shall be found guilty of such neglect will be held to a strict accountability.

Rule 12.—No man should attempt to work out, or bar down coal or roof, with a pick, drill, or crow bar, where he is obliged to jump back after every blow he strikes. The fact that he thus jumps back is positive proof that he realizes the danger, and yet many lives have been sacrificed to the folly of running such risks. There is always a safe way to work in all such cases, and any man who cannot find that safe way is not competent to mine coal.

Rule 13.—Every miner, the first thing upon entering his working place in the morning, should examine every part of the roof and coal, to make sure that there is no loose rock, slate, bone, or coal hanging to endanger the life and limbs of himself and laborers; and if he finds a prop needed he should stand it at once. Many lives have been lost by putting this off until a "blast has been fired," a "car loaded," and other inexcusable causes of delay. And if the miner goes home leaving his laborer after him in the mines, he should examine the working place carefully and make it absolutely safe before leaving it. This should be done in all kinds of places, whether the roof is considered safe or not.

Rule 14.—When a mine boss gives an order to draw down a piece of dangerous roof or coal, or gives an order to stand a prop or props, he must insist upon his order being executed immediately, for if he allows procrastination and delay, and an accident should occur in such a case, he will be held to a strict accountability for such accident.

Rule 15.—All reports of accidents are to be made direct to the inspector, and in no case should such report be delayed by forwarding through the general office. This is also the truth relative to air measurement reports.

Rule 16.—Every foreman, or mine boss having men under his charge,

either outside or inside, is hereby ordered to inform every person to whom the foregoing rules apply, of the tenor of this circular; and every person, whether foreman, boss, or workman, is hereby notified that where either or any of them shall disregard these simple rules after this date, and an accident shall occur on account thereof, they must expect to bear the consequences.

NOTE.—The foregoing rules have been prepared with the sole object in view of reducing the fearful number of accidents, thereby saving the lives and promoting the health and general safety of the workmen employed in the coal mines of this district; and it is hoped that proprietors, agents, superintendents, foremen, mine bosses, and all the workmen, will cheerfully and heartily coöperate to make the rules effective for the purpose for which they are intended. Those in charge of the several collieries are earnestly requested to enforce the rules rigidly; and the workmen must do their part to save themselves from accidents and death, or the labor and care of others will necessarily be all in vain. Let no one blame the inspector, if he is driven to the use of severe measures towards negligent and incompetent foremen and mine bosses, and careless and reckless workmen, after the issuing of this circular.

WILLIAM S. JONES,
Inspector of Coal Mines.

SCRANTON, PA., *April 9, 1877.*

Of course I knew that these rules had no force in law, only so far as they were based upon the law itself, but I believe there is nothing in them but what the law implies, and surely nothing at variance with it. They will serve as a sample of many rules that might be formed bearing upon the duties of all classes of employés, and all kinds of work. When I issued these rules many of our mine bosses refused to *try* to enforce them, and hid them away from their workmen in their capacious pockets, and some of them treated them with ridicule in the presence of the men, thus making them, in their cases, of no effect. Still, I am satisfied that they did considerable good in those places where they were carried out in good faith.

The Large Number of Non-fatal Accidents.

As will be seen by referring to table No. 2, that the number of non-fatal accidents for 1877 is unusually large. I have already stated that a large percentage of them was caused by inexcusable carelessness and neglect, and it might be inferred from that that there was a greater amount of such carelessness and neglect on the part of mine bosses and employés during last year than in any year previous; but I do not wish to be so understood. On the contrary, I believe that there is a marked improvement in this respect in many of the collieries.

The large number of the accidents can be accounted for in more than one way. Many of them were comparatively slight, and in former years such accidents were not reported, because they were not considered

"serious." The law says: "Whenever loss of life, or SERIOUS personal injuries, to any person shall occur, by reason of any explosion or other accident whatever, in or about any coal mine or colliery, it shall be the duty of any party in charge of such coal mine or colliery to give notice thereof forthwith, by mail or otherwise, to the inspector of coal mines and collieries for the district," &c. And the question arises, What constitutes "serious personal injuries? and who can tell what degree of injury a person must suffer to make it *serious?* I have known cases where the injuries were considered too slight to report at the time of their occurrence, which in a few days resulted in death; and I have therefore requested that *all* accidents, however slight they may appear, be reported immediately to the inspector. This has been done all through last year, and the list is larger on that account.

But there is another cause for the increased number of those accidents. For the greater part of the time during the year, the mines were working only on alternate weeks—one half working one week and the other half the next—and the miners were, therefore, under considerable disadvantage to keep the condition of their working places in their minds. They might one day detect a slant or break in the roof or coal, but after being idle for a week they would forget all about it, and not think of it again until it would fall, injuring either them or their laborers, or perhaps both. The ratio of accidents for half time, or irregular working, is always greater than when the works run constantly and regularly.

Improvements in Ventilation.

I have labored hard through the whole year to secure extensive improvements in the ventilation of such collieries as I was forced, in my report for 1876, to pronounce far from being up with the requirements of the mine ventilation act. Considerable improvements have been effected, but I was in hopes, at the beginning of the year, that much more would have been done during the year than has been done; still, taking all things into consideration, the improvements have been numerous and important. The condition of the coal trade has been so unsettled, and the demand for coal so irregular and limited, that the collieries have only worked a little over half time, so that it was very hard to prevail with the corporations and individual operators to lay out any money on the ventilation of their mines. I have in all cases refrained from using severe measures to enforce my demands, and have only issued peremptory orders to suspend work in two instances, and in both instances my orders were complied with without forcing me to apply to court for injunctions. In each of these cases my reason for stopping the collieries was that there was immediate danger to life. The first was No. 4 shaft, Gipsey Grove colliery, Dunmore, owned and operated by the Pennsylvania Coal Company, where a furnace was located at the bottom of the hoisting shaft. The defense made for putting in a furnace there was that, the law only prohibits the use of furnaces in

shafts where the "coal breaker and chute buildings are built directly over and covering the top of the shaft." I admit that in this case there was neither "breaker nor chute buildings directly over and covering the shaft," but there was an engine-house and tower for hoisting the coal out of the mine, and a wooden stack, forty feet high, over the shaft and furnace, and connected with the engine-house. I held that the intent and purpose of the mine ventilation act was what its title indicated: "An act to provide for the health and safety of persons employed in and about coal mines." The intention of the act where it provides, section seven, that "*in no case shall* a furnace be used in the mines where the coal breaker and chute buildings are built directly over and covering the shaft, &c.," is to prohibit the use of a furnace where there is danger from fire from wooden buildings, no matter what name the buildings may be designated by. Ten thousand feet of lumber will burn as readily in an engine-house, tower, and stack, as if it were used in a "breaker and chute buildings," and no one will deny but that the result, under the same circumstances, would be equally disastrous in the one case as in the other. Holding these views, I wrote to John B. Smith, Esquire, the general agent of the company, on the 7th of May. On the 17th of May, I went to see what had been done, and finding the colliery still in operation, I again communicated with Mr. Smith, and the colliery was stopped, and, in the course of a few weeks, the furnace was removed, and a seventeen feet fan was put in in place of it.

The other case was at the Green Ridge slope, Dunmore, operated by Messrs. Riley & Johnson. In the latter part of June they developed an immense feeder of carbureted hydrogen gas, which was being conveyed with the air current to all parts of the mine, making the atmosphere of the whole mine within a trifle of being in an explosive state. Mr. J. P. W. Riley, who was then superintendent of the colliery, wanted permission to wall up the gangway and air-way in which the gas was escaping, and when I went there on the 2d of July to emamine it, I found a gang of men engaged in digging a foundation for the proposed wall. Of course I at once stopped such a reckless plan, and I gave explicit orders not to resume work until they had put in a fan to provide the necessary amount of air to dilute the gas and render it harmless. I had asked Mr. Riley to improve the ventilation of this mine on the 14th of April, and again on the 29th of May, but he elected to disregard all my appeals; hence, I had no other safe course left but to close the colliery. This was done, and, in about three weeks, a fan was put in on an air shaft, which they had already sunk, and the volume of air was increased from almost nothing to from fifty thousand to seventy thousand cubic feet per minute. This put the mine in a safe condition, and, with the understanding that the air-ways would be immediately improved to conduct the air through the face of the workings, I allowed them to resume work.

I might have procured injuctions to close a large number of collieries, for the want of proper ventilation. All the mines of the Delaware and

Hudson Canal Company, at Carbondale; Jermyn's shaft and slope, at Jermyn; White Oak mines, D. & H. C. Co., and Jones, Simpson & Co.'s mines, at Archbald; Grassy Island shaft and part of Eddy Creek shaft, D. & H. C. Co., Olyphant; Fair Lawn slope, Hosie, Archbald & Hosie, Scranton; Park Coal Company's slope, Hyde Park; Sibley shaft, Penn. Anthracite Coal Company, Old Forge township; Greenwood mines, belonging to the same company, Lackawanna township; Columbia mines, Groves Brothers; Rock Hill tunnel, Bowkley & Sons; Beaver mines, Waterman & Beaver; Seneca slope and Ravine shaft, Pittston Coal Company, all of Pittston; Everhart colliery, Hon. Thomas Waddell, Jenkins township, and several of the Pennsylvania Coal Company's mines in the same township and elsewhere. All of the above named collieries could have been closed by injunction, for the want of the amount of air the law requires. But, had I proceeded against them according to a rigid construction of the law, the majority of them would have remained idle during the greater part of the year, and hundreds of poor workmen, who, with their families were already nearly in a starving condition, would have been thrown out of employment, and would have suffered tenfold more privation and want than they have suffered. I could not enforce the law with severe exactness, with these painful facts staring me in the face, though my desires were intense to force and hurry up the improvements which were so sorely needed. If I have erred in being too lenient under a strict construction of the law, my conscience does not reprove me, and I believe that all good men will commend the course I have pursued, and that the workingmen will do me the justice of admitting that I have tried to do what was for their best good. Of two evils I have undoubtedly chosen the least. The companies have complained that I have been too severe with them, as most of them do when they are asked to do anything for the good of their employés, especially if it requires the expenditure of a sum of money; but they have no cause to complain of my dealing too severely with them. They ought rather to thank me for not visiting punishment upon them for their persistent disregard of the law, for long years after it was enacted. It is true that I have given them no peace, and I do not intend that they shall have peace until they comply with the law in every particular.

It would have been much easier for me to take the course laid down in the fifth section of the mine ventilation act, but, under all the circumstances, I firmly believe that I have accomplished more good, though at the expense of much greater labor, by the course I have pursued.

What has been Accomplished.

The Delaware, Lackawanna and Western Railroad Company's mines were in excellent condition, as to ventilation, at the date of my last report, and nothing was left to be desired. They have, however, put in a new fan at the Taylor shaft, and they now have three fans there, one of them being an extra fan to be used only in case of accident to one of the

others. This colliery evolves immense volumes of gas, but it is well provided with ventilators, and the ventilation is good. This company keeps its place at the head of the list, and from present indications it will hold its place there for all future time.

The Delaware and Hudson Canal Company have made some valuable and much needed improvements, but it has been like pulling teeth to get them to do anything. They have taken over a year to do what ought to have been done in two months at the furthest, but I am very grateful for what has been done. They have erected two new seventeen-feet fans at Carbondale, which are to ventilate No. 1 and No. 3 shafts and White Bridge tunnel. These are the first fans ever erected at Carbondale, and if the air courses are improved, so as to conduct the air properly through the face of the workings, they will inaugurate a new era in their ventilation.

The five tunnels, constituting the Coal Brook colliery, should and must have two fans in place of the three furnaces which are now robbing the company and cheating the workmen. White Oak mine, Archbald, and Grassy Island shaft, Olyphant, need a fan each, and then the Delaware and Hudson will go ahead of the Pennsylvania Coal Company, and take its place second on the list. They might be placed alongside of the D. L. & W. were it not that they will never have their air courses in as good condition as are those of the latter company. I expect the D. & H. C. Co. will go on making these other improvements during 1878.

The Pennsylvania Coal Company's collieries are not in as good condition as I could wish, taking them altogether. Where they have fans, the ventilation is satisfactory; but where they use furnaces it is far from being so, and in some of the collieries, especially in spring and autumn, when the season changes, it is very bad. The system of ventilation in their collieries in Jenkins township is very objectionable and injurious. Here, the No. 2 slope, No. 4, No. 5, No. 6, No. 7, and No. 11 shafts, and No. 4 slope, are all ventilated with one continuous current passing from one to the other, and carrying the impurities of one mine into the other for several miles. It is true that there are additions made here and there on the route, but nothing like enough to purify the air. The law requires that each mine or colliery shall be provided with "pure air," and every intelligent man knows that air passing from one mine into another cannot be "pure air," but must be heavily charged with "noxious and poisonous gases."

In the latter part of June, I traveled through all the workings of the above named collieries, and examined the system of ventilation with great care; and upon finding it as above stated, I made my views known to J. B. Smith, Esquire, and by his request wrote to Andrew Bryden, Esquire, demanding such improvements made as would remedy the evil. Messrs. Bryden and Law, the mine superintendents, did not admit that their mines were as I represented, and would do nothing until they had made an examination themselves. But on making the examination, they were forced

to admit that I was right, and as a further proof of my correctness, they have commenced to make the very improvements that I had suggested. They have not gone so far as I had asked them to go, but they are moving in the right direction, and are making valuable improvements. One new fan has been erected which will help the ventilation very materially in that section. They have erected a new fan also at No. 10 shaft, and still another at No. 13 shaft, which makes four new fans for this company to put in during the year.

The following small companies and individual operators have also erected fans during the year 1877: Alva Tompkins, at the Tompkins shaft, Pittston; Pittston Coal Company, at the Ravine shaft, Pittston; Pennsylvania Anthracite Company, at the Sibley shaft, Old Forge township; Park Coal Company, at their slope, Hyde Park; Green Ridge Coal Company, at their Green Ridge slope, Dunmore; and a second fan has been put in by John Jermyn, Esquire, at his Green Ridge shaft, Scranton—making the whole number of new fans put in during the year, thirteen. Hosie, Archbald & Hosie are sinking an air shaft for their Fair Lawn slope, and purpose putting in a fan soon.

Plans, or Maps of Mines.

The first section of the mine ventilation act has a clause which required that a complete and true map of all the workings of each coal mine or colliery, as they stood when the law was enacted, should be furnished to the inspector within four months from that date. The marking of those maps with the words "Worked out," or "Old workings," covering all up to the time the act was passed, in my opinion, was not a compliance with the law. I feel positive that it was intended that the inspector should have a true and correct map of *all* the workings up to that date; and circumstances may arise at any time when it may be of the greatest importance that he should have them in his possession. Extensive caves are liable to happen at any time, closing up the main traveling ways, and inclosing the men employed inside of the cave, when it would be necessary to find a way in to the men through those very old workings, the maps of which are refused to the inspector, and which would be guides for him if he had them. Such caves have already occurred, and I have myself experienced the painful sensation of being entombed in this manner; and had it not been that there was *one* man, Alexander Bryden, Esquire, who knew every yard of the workings, and who was brave enough to work his way through the old workings and over the edges of the cave, about sixty men would have been lost. I refer to the extensive cave at Carbondale on the 12th of January, 1846, where fifteen lives were lost.

It may be argued that there are second openings now to all collieries—which, however, so far as tunnels and drifts are concerned is not the case—but even admitting that there are second openings now to all our collieries, so there were at Carbondale in 1846. There were five openings there, but they were all closed.

Caves are frequently occurring in these days in our mines, and we are liable at any time to have great loss of life from this cause, and I believe we are far more liable now than thirty-two years ago, for the reason that our mines of late years are not one quarter so well propped as they were then. Then, again, our mines in many localities are liable to sudden inundations, and to be filled with water. In many places they run under the rivers, and in other cases mines are being worked under old abandoned workings which are full of water, and caves may occur at any time in those places, ingulfing the workmen with an ocean of water, without our having any means of knowing where the danger may exist.

Now, this clause in the law has been wholly disregarded, almost universally in this district, and I had, and am still having, what might be deemed unnecessary trouble with the corporations, in my efforts to have those maps furnished. There are miles of underground workings, of which there are no maps. The boundary lines, the inclination of the strata, and the survey stations are wanting on the majority of them that we have, all of which are important to have, but space will not permit me to explain further, at this time.

Examination of Mine Bosses.

Bills are annually introduced in the Legislature to prohibit any person that is not competent to have charge of steam engines, and to prohibit the practicing of medicine by quacks, and for other purposes, which are very proper and much needed. But I most respectfully submit that there is no profession where greater damage is done to lives and property through incompetency, than that of mine boss, and I do not hesitate to assert that the standard of qualifications for this important office is away down below zero. The manner in which many of our collieries are worked is a great loss, in a pecuniary sense, to the operators, for acres of coal are lost to them and to the country, often because the mine bosses are incompetent to devise ways and means to mine it; and in other cases, they go in and gut out the coal, without any regard to the future safety of the colliery. Any expert, who will take the trouble of glancing at the map of Jermyn's Green Ridge shaft, on another page, will see an example of the gutting process. But the worst aspect of the case is, that they know literally nothing about the science of mining, nor about the science of ventilation, and, hence, are wholly incompetent to take care of the health and safety of the men and boys employed in the mines, and who are under their charge. Many of them are entirely illiterate, know nothing of the value of figures, and make no effort to improve themselves. They get into positions through favoritism, and not on their merit. Many of them are selected because they are of a disposition pliable enough for the corporations to make willing tools of, to oppress the workmen and crush them with their petty tyranny.

I earnestly recommend that an act be passed, providing for a commission or board of examiners, whose duty it shall be to examine all persons

now holding the position of mine bosses, and all persons who may desire to apply for a position as such, and who shall give to all such as they may find competent, certificates to that effect, and no person should be allowed to hold, or apply for the position of mine boss, until he could show a certificate of his qualification. The managers of coal mines in Great Britain are compelled to undergo such an examination as I suggest, and I think there can be no doubt in the mind of any man but that we need a higher standard in America, and I sincerely hope the time is not far distant when we shall have a radical reform in this matter.

The Mine Ventilation Law.

It seems very strange that we cannot get the mine ventilation law correctly published for our use, as it now stands. Several attempts have been made to insert it in the annual reports of the inspectors. It was published with the reports of the inspectors for 1875, by P. F. McAndrews, mine clerk for Schuylkill county, &c., but it was utterly useless, in the form it was then published, because of the numerous additions and omissions which unaccountably crept into it. Those errors were corrected by my friend, T. M. Williams, Esquire, inspector of mines for the Wilkes-Barre district, in his report for 1876. But, through some oversight, Mr. Williams did not include the supplements. The original act has again been published in pamphlet form, by the State printer, for free distribution, but the supplements have been omitted in this also. It is fortunate that the supplements do not bear upon the duties of any class immediately employed in the mines. The supplement reënacting the first section, which was approved May 8, 1876, is of considerable importance to owners and operators of collieries, and for their information and guidance I think proper to insert it. I also insert the supplement amending the fourteenth section. All the other sections remain as at first enacted.

A supplement to an act, entitled "An act providing for the health and safety of persons employed in coal mines," approved the third day of March, A. D. 1870, making the neglect to comply with the first section of said act a misdemeanor.

Section 1. *Be it enacted, &c.*, That the first section of the said act be amended so as to read as follows, namely: "That the owner or agent of every anthracite coal mine or colliery shall make, or cause to be made, an accurate map or plan of the workings of such coal mines or colliery, on a scale of not more than one hundred feet to the inch, which map or plan shall exhibit the workings in each seam of coal, and shall state the general inclination of the strata, with any material deflection therein in said workings, and shall truthfully and accurately show the boundary lines of the said coal mines or colliery, and the proximity of the workings to the lines of adjacent owners, a true copy of which map or plan the said owner or agent shall deposit with the inspectors of coal mines or collieries for the district in which the coal mine or colliery is situated, within four months from the passage of this act, and one copy shall be kept at the office of each colliery; and the said owner or agent shall furnish to the inspector

aforesaid on the first day of January and July in every year hereafter, a statement or map or plan of the progress of the workings of such coal mine or colliery during the six months past up to date, to enable the inspector to mark the same upon the map or plan of the coal mine or colliery furnished and deposited with said inspector as hereinbefore provided for, and when any coal mine or colliery is worked out preparatory to being abandoned, or when any local lift thereof is being finished with a view and for the purpose of being abandoned, the owner or agent of such coal mine or colliery shall have the map or plan thereof furnished as hereinbefore provided, or such portions thereof as the case may require, carefully verified, and notice shall be given to the inspector of coal mines and collieries for the district, in writing, of the purpose to abandon; and in case the said owner or agent shall neglect or refuse to furnish the maps or plans by this section required, or any of them, or shall knowingly or designedly cause such maps or plans when furnished to be incorrect or false, such owner or agent thus offending shall be guilty of a misdemeanor, and upon conviction shall be punished by a fine not exceeding five hundred dollars or imprisonment not exceeding three months at the discretion of the court."

J. F. HARTRANFT.

APPROVED—The 8th day of May, A. D. 1876.

A supplement to an act, entitled "An act providing for the health and safety of persons employed in coal mines," approved the 3d day of March, A. D. 1870.

SECTION 1. *Be it enacted, &c.*, That inspectors of coal mines and collieries, provided for in the fourteenth section of an act, entitled "An act providing for the health and safety of persons employed in coal mines," approved the third day of March, Anno Domini one thousand eight hundred and seventy, shall, and may be appointed by a majority of the board of examiners, provided for in said act; should said board of examiners disagree in their selection of inspector, the judges of the court of common pleas of said counties have the power to dissolve said board and appoint a new board of like qualification as aforesaid.

SECTION 2. All laws or parts of laws inconsistent with this act, are hereby repealed.

APPROVED—The 25th day of April, A. D. 1873.

J. F. HARTRANFT.

Mine Instruments.

THE ANEMOMETER.—There are many of the collieries still without this instrument, which tends to show how little interest is taken in the proper ventilation of the workings. Every colliery should have one for the exclusive use of the mine boss. The law requires that the air in all collieries shall be measured at least once per week at the inlet, at the outlet, and at or near the face of all gangways, and all the measurements to be reported to the inspector once per month. But this is not done because there is no instrument at hand. There are exceptions, however, where the air is

measured regularly each week, but the rule is that the measurements are made at irregular intervals of from three to twelve days. The mine boss ought to measure the air much oftener than once per week for his own information, and where there is much inflammable gas evolved, he should have an anemometer ever at hand to ascertain the amount of air conducted to each working place, so as to be sure that the proportion of air and gas is not in an explosive state. If proper interest were taken, and proper care exercised in this respect, most of the explosions which now occur would be averted; and we would never meet with instances of explosions occurring to open the eyes of the mine boss for the first time that there is gas in a place. As it is, some poor unfortunate person must get burned by an explosion before the mine boss is aware of the existence of gas in their mines, and this is the only way many of them have to find it out. The operators ought to be compelled to provide an anemometer for every mine boss, and then the mine boss ought to be compelled to use it so that he would have no excuse for his ignorance relative to the condition of the ventilation of any part of the mines under his charge.

The Water Gauge.—No mines should be without a water gauge, for, unless the mine boss has one, he cannot well get along. The friction of the air in its passage through the mines is a subject that demands the study and attention of the mine boss continually, and the water gauge will assist him to find its amount. And when he finds the water gauge high, he is at once assured that there is something radically wrong with his air courses. He is then led to examine them, when he will invariably find that they are narrow, irregular, unshapely, and obstructed; and then he can apply the remedy. This instrument is so cheap that the cost cannot be the reason that there is not one at every mine. Indifference is the only excuse that there are so few of them to be found.

The Barometer.—The barometer is almost entirely wanting, but several have provided themselves with this instrument during the last few months, and several others have promised to do so soon. Without a barometer there is no way to ascertain the amount of the atmospheric pressure, nor its variable and frequent sudden changes; and this again is an important factor to be considered, if we would be masters of the situation. Those having charge of the ventilation of mines should know exactly what the useful effect of their ventilators will be under all conditions of the atmosphere. It matters not what the mode of ventilation may be, whether it be produced by furnace, fan, or any other mechanical means, or whether it be natural ventilation, the pressure of the atmosphere is always important to be taken into careful and intelligent consideration.

The Thermometer.—The use of this instrument is so well understood that it needs no comment; and still there are but very few of them in use at our collieries. The excuse advanced for the scarcity of barometers and anemometers, i. e., that they cost too much, cannot be an excuse for not having theremometers and water gauges. A good self registering there-

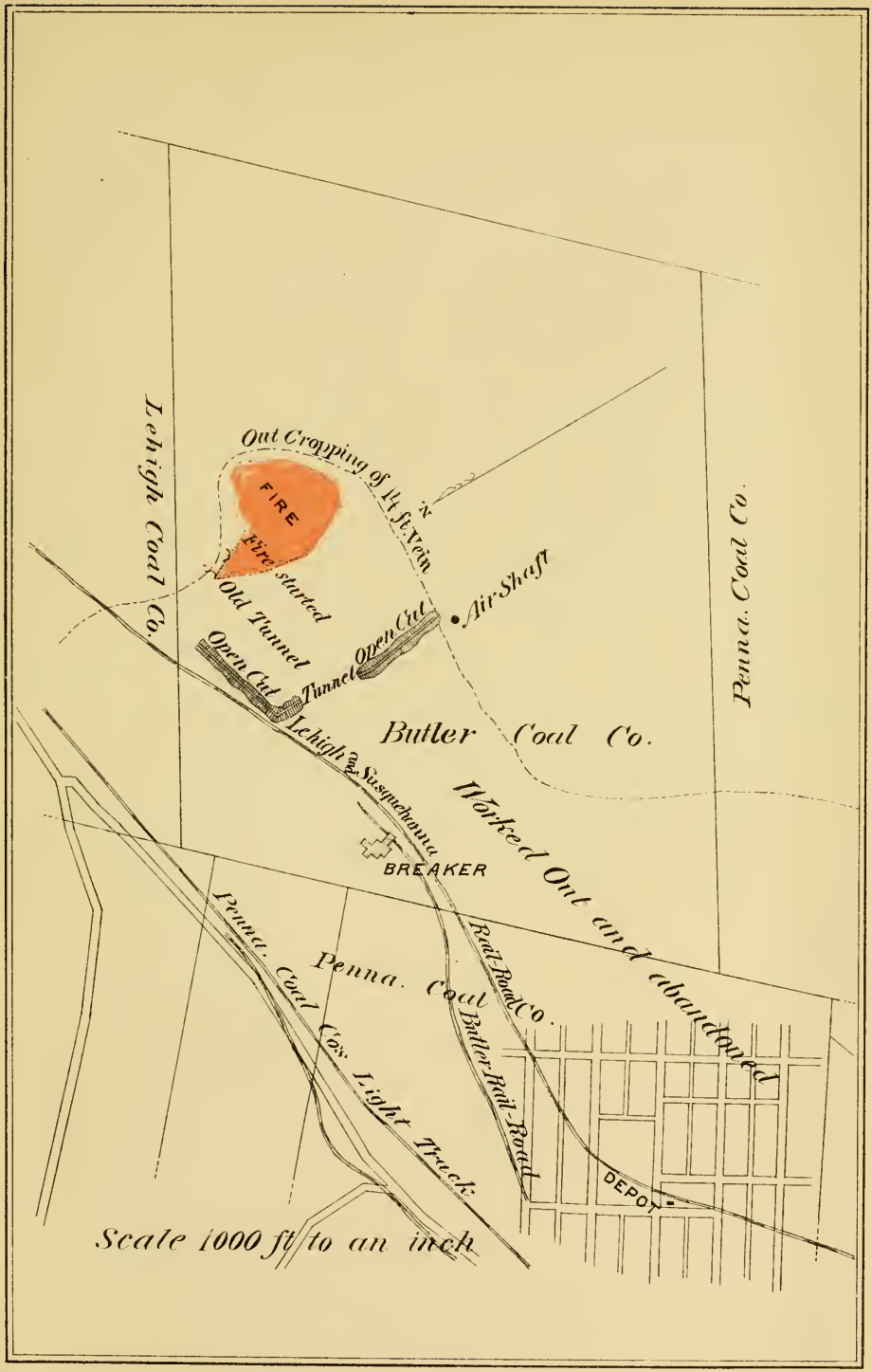
mometer will cost but a trifle, and the price of the water gauge is only $3 50 to $4 50. But I am more than convinced that the cost is not the trouble, but it is the general indifference to, and ignorance of their uses.

Fire in the Mines.

ROARING BROOK SHAFT.—At six o'clock, Tuesday morning, July 17th, 1877, the stable in the lower vein of the Roaring Brook shaft, Dunmore, was found to be on fire. It had got on fire some time during the previous night, but it is not known how long a time it had been burning, nor is it known how it was set on fire. When discovered, the fire had burned out all the wood work of the stable including the props which supported the roof; nine mules were also burned, and were buried there by the roof caving in upon them. The fire spread rapidly, and extended into the adjoining old workings, where a large number of log pillars had been put in to protect the shaft from a general crush of the workings, which occurred some years ago. On being notified of the fire, John R. Davies, Esquire, general superintendent of the colliery, immediately applied to the Nay Aug hose company of Scranton for hose, which the generous and large hearted Nay Aug boys readily granted; and by half-past seven o'clock there was a stream of water on the fire. The hose was attached to the steam pumps in the engine house on top of the hoisting shaft, and thence conducted down the second opening to the fire.

I was informed of the fire late in the afternoon of the same day, and I repaired to the colliery with all possible haste; but on reaching the head of the shaft I was informed that the fire was completely under control, and some of the men believed it was entirely extinguished; hence, I did not descend the shaft that night. By request of Mr. Davies, I visited the colliery again the following morning, and I immediately descended the shaft to the scene of the conflagration, where I found the fire burning fiercely; Patrick Mongan, the mine boss, was there in charge of a gang of men hard at work, digging their way in to the fire. I remained there all that morning, and simple justice demands that I should say that all the men working there seemed to understand exactly what was proper to do and when and how to do it; they were forced to prop the roof yard by yard as they advanced, but there was always a prop ready, without a moment's delay, whenever one was needed. After looking on for some time I saw that the fire was advancing into the old workings nearly as fast as the men could follow it, and I suggested that they stop uncovering it, and work their way around the fire, and as near to it as the heat would permit. This suggestion was acted upon, and by the following morning the men had made an opening all around the fire, and were masters of the situation; then the water was turned on to the very heart of the fire, and by night of that day, the water and steam had put the fire out, but the roof and surroundings were still so hot that the water was kept on until Saturday, the 21st.

John R. Davies, Esquire, deserves credit for his prompt and sagacious


Lehigh Coal Co.
Out Cropping of 14 ft. Vein
FIRE
Fire started
Old Tunnel
Open Cut
Tunnel
Open Cut
Air Shaft
Penna. Coal Co.
Butler Coal Co.
Lehigh & Susquehanna
BREAKER
Worked Out and abandoned
Penna. Coal Co's Light Track
Penna. Coal
Rail Road Co.
Butler Rail Road
DEPOT
Scale 1000 ft to an inch

action in directing the men and in supplying them with everything required by the emergency; his foresight had everything on hand so that not a minute's time was lost; and had it not been for this, the fire, having gained so much headway before it was discovered, would have spread into the workings in spite of the untiring and faithful labor of the mine boss and fire boss, and the workmen under their charge, causing incalculable damage and loss to the company. It gives me pleasure to testify that all parties who took part in extinguishing the fire—the workmen as well as the superintendent and bosses—deserve great credit for the cool and sound judgment exercised in all that was done. It would be hard to find a set of men to work so well together to extinguish a fire, as these men of the Roaring Brook colliery.

Butler Mine Fire.—Considerable has been published relative to this fire in the columns of our local press, and a few lines relative to it may not be out of place here.

The fire originated in an old abandoned mine which was worked out many years ago, at a point near the outcrop of the fourteen feet or Pittston vein, and on the highest ground of the Butler property. It was undoubtedly set on fire by some scamps, who apparently made an old drift in that location their head-quarters. The attention of S. B. Bennett, Esquire, the superintendent of the Butler colliery, was first called to the fire some time in June, 1877. It had made considerable progress south-east of the pitch, along the standing pillars, when it was first discovered, and it was hoped, from the direction it was taking, that it would not travel down the pitch, and steps were immediately taken to cover up the cave holes through which the air penetrated to the fire. This in a measure retarded its progress, but it still continued to spread. As there was no water obtainable, an arrangement was made with a party to open and clear out an old chamber, with the view of cutting the fire off; but owing to the incompetency of said party, this work failed to answer the purpose and had to be abandoned.

Now, however, a plan has been adopted, (though it must incur very heavy expense,) which cannot fail to succeed. A point has been selected, about eight hundred feet from the fire, at which an open cut is being made from the surface down to the old workings, which will be about three hundred and fifty yards in length, twenty feet wide at the bottom, and the depth ranging from twelve to forty-five feet. The engineer in charge, Mr. C. T. Conrad, estimates the possible removal of fifty thousand cubic yards of materials, but he hopes to be able to tunnel a part of the way. The work is being pushed forward vigorously.

The progress of the fire is slow, but is more rapid in cold than in warm weather. About five acres have been burned over, and there are about five acres more to burn before the fire reaches the cut. No coal of any value will be destroyed, for there remains no unworked coal in this vein on this or any adjoining property, excepting about ten acres on the south-east,

owned or controlled by the L. V. Coal Company. The fire, where it was first set, seems to have burned itself out, and that section is nearly cold.

These old workings were never surveyed, and there is no map or plan of them in existence. The accompanying map will show the location of the fire and its proximity to the adjoining properties. The plan explains itself and needs no explanation in addition to what appears on its face.

The danger of damage from the fire arises from its spreading through the old workings into the workings of the Pennsylvania Coal Company, and consequently under the town of Pittston.

The Tables Explained.

Tables Nos. 1 and 2 contain a list of all the accidents that occurred during 1877, and their causes; and each colliery is charged with the accidents which occurred at each, respectively; and it is hoped that all parties in charge of those collieries will examine these tables carefully, and inquire into the reason why so many more accidents occur in their mines than in others.

Tables Nos. 3 and 4 require no explanation.

Table No. 5 contains some interesting statistics in relation to the amount of work done during the year. The figures relative to the amount of powder used by the three large companies are estimates, because the agents of those companies saw proper to deny me the exact figures. The estimates, however, are very nearly correct, and may be relied on, I have given the number of tons of coal mined at each colliery; but it is proper, perhaps, to explain that the tons of the Delaware and Hudson Canal Company and the Pennsylvania Coal Company, with several, if not all the smaller operators, whose coal is marketed by said companies, consist of twenty-seven hundred weight. Or, in other words, these companies require their miners to insure them a full ton of coal at tide water, after all the leakages and waste of transportation. But the ton of the Delaware, Lackawanna and Western Railroad Company, is a ton of two thousand two hundred and forty pounds at the mines, and all the smaller operators, who deliver their coal to this company, rate their tonnage in the same manner.

By referring to this table, parties in charge of each colliery can ascertain the ratio of coal produced by them for each life lost, and for each person injured during the year 1877, and during the last four years. The ratio ranges from 11,933.5 tons, at No. 6 slope, Pennsylvania Coal Company, to 159,268 tons, at the Von Storch slope, D. & H. C. Co., for each life lost during 1877; and from 15,691 tons, at Tompkins' shaft, to 459,575 tons, at the Sloan shaft, D. L. & W. R. R. Co., for each life lost during the last four years. It will be noticed that several collieries have escaped fatal accidents for four years. The ratio of coal mined per life lost by the large corporations is as follows: The average production of the D. & H. C. Co., for 1877, was 255,476 tons, and for the last four years it was 136,841 tons; the average for the D. L. & W. R. R. Co., for 1877, was 112,485 tons, and

for the last four years it was 107,604 tons; the average for the P. C. Co., for 1877, was 93,825 tons, and for the last four years it was 94,598 tons. The average production for each life lost in the whole district, for the year 1877, was 120,205 tons, and for the last four years it was 111,558.37 tons.

The D. & H. C. Company is at the head of the list in this respect, with the D., L. & W. Railroad Company second, and P. C. Company third. This is easily accounted for, and is a correct indication of the amount of timber used in propping by each company respectively. The mines of the D. & H. C. Company are far better timbered than those of either of the other large companies, and there is but very little difference between the propping of the other two; but the Pennsylvania Coal company has a very treacherous roof over the greater portion of their coal, consisting of what is known as "black rock," and which the workmen call "the man-killer," and this accounts for the difference in the ratios of these two companies.

If mine bosses, and others in charge of collieries throughout the district, will study this table and inquire why they have so many accidents, they cannot fail to find the cause, and then they can apply the proper remedy. This, in addition to the general information which the table contains, was the chief end of its compilation.

Table No. 6 is not complete, but it is as full as I could make it with the data furnished by the master mechanics. I am necessarily dependent on them for these datas, because I cannot afford time to collect them myself. However, it will give a very correct idea of the amount of machinery under the charge of the inspector and used in the mining of coal in this district.

Table No. 7 is also incomplete, for the same reason as is given for the table above mentioned. But it is believed that there is much valuable information in it as it is, that will be interesting to those who are connected with mining coal.

Table No. 8. I had hoped to be able to include all the fans in the district in this table, but I have been disappointed. All the fans of the Pennsylvania coal company I have been obliged to leave out, because the mine superintendents of the company could not be induced to provide the necessary data to enable me to include them There must be a reason for this, and I submit that it must be one of the following: Either the superintendents are supremely indifferent relative to the power exerted on the ventilation of their mines by their fans, and consequently of the condition of the ventilation itself; or, they do not desire to compare the utility of their fans with that of the fans of other companies, because they feel conscious that the comparison would result unfavorable to them; or, they know nothing scientifically relative to the subject of inquiry. The reader can draw his own inference. The Pennsylvania Coal Company fans, seven in number, are the only ones omitted.

It will be seen that the fourteen feet fan at the Bellevue mines of the Delaware, Lackawanna and Western Railroad Company, gives the best result of any in the district. It exhausts 1,663 cubic feet of air per revo-

lution, or 149,694 cubic feet per minute, with a water gauge of only .3 of an inch, the power applied being 5.47 H. P.

The fan at the Ravine shaft of the Pittston Coal Company gives very unsatisfactory results, and the difficulty is to be found in the contracted sectional area of the upcast and in the miserably constructed air-courses, and can be easily overcome by a small outlay of labor.

This table has cost me a large amount of labor, but I am happy to believe that it has answered a good purpose. It has caused an unusal amount of inquiry into the subject of ventilation by our mine managers, and the inquiry will go on and cannot fail to do great good. My intention was to compile a table on fans and another on furnaces, for the purpose of comparing them.

Table No. 9 includes as many furnaces as I could collect data for. All the furnaces of the Pennsylvania Coal Company, and all but one belonging to the Delaware and Hudson Coal Company, are omitted; but the latter were omitted because the fire was drawn when the inquiry was made in relation to them, the mines being idle. The furnaces of Jermyn's shaft and slope, Jermyn, and at the Eaton colliery, Jones, Simpson & Co., Archbald, have also been omitted for the want of the necessary data.

It would be interesting, perhaps, to comment on all the furnaces, but my time at present will not permit it, and it must suffice, therefore, to notice one or two of them. There is only one furnace in the table that can be rated as a first-class one, and that is the one at the Dodge shaft, belonging to the Delaware, Lackawanna and Western Railroad Company. I do not know that there is another in all the coal regions that will compare with it. This one is a double furnace, having a grate surface of 112 square feet; the sectional area of the upcast is 132 square feet, and it has a vertical depth of 330 feet, and when last tested it gave 142,406 cubic feet of ventilation, the horse power being 26.66. Now the original cost of this furnace must have been greater than the cost of the Bellevue fan with the engine and all complete, and the running expense of the furnace, compared with that of the fan, is simply enormous.

The poorest furnace in the table is that at the Filer colliery, at Winton. But the difference in the temperature between the downcast and upcast, in this case, is so unaccountably small, that I judge there must be a big mistake in it.

The table will demonstrate, I think, to the entire satisfaction of all scientific and candid minds that furnaces in shafts, under one hundred feet deep, are entirely worthless, even in the most favorable season of the year, and it is my candid opinion, that money expended on furnaces in workings under three hundred feet deep is money very unwisely invested, to say the least; and under any and all circumstances, the fan is by far the best and cheapest mechanical means to ventilate our collieries. All of those tests have been made under the most favorable conditions to the furnaces; and I hope to see the day when all these furnaces will be re-placed with fans,

and I am highly encouraged in my efforts to have this desirable change consumated, for it is evident, even now, that our ablest mine superintendents are thoroughly convinced that the change will be an immense saving to the operators, and that it will insure good ventilation, which the furnaces cannot give.

Table No. 10 is intended as a mine directory, and contains the names of all mine officials.

TABLE No. 1.—List of Accidents resulting in death reported to the Inspector the cause as shown by his investigation, for the

DATE.	Number of accident	NAME OF PERSON KILLED.	Age.	Widows.	Orphans.	NAME OF COLLIERY.	LOCATION OF COLLIERY.
Jan. 6,	1	Fred. Bonnenblust,	38	. .	. .	Taylor shaft, ...	Taylorville, Lackawanna twp.
9,	2	Henry Theile, . . .	35	1	1	Filer colliery, ...	Winton, Blakely township, .
15,	3	David Edwards, . .	38	1	2	Erie shaft, ...	Carbondale township, ...
15,	4	William Durkin, .	33	1	2	Hampton shaft, ...	Hyde Park, ...
25,	5	Michael Judge, . .	40	1	9	Meadow Brook tunnel, .	Scranton, Twentieth ward, .
Feb. 12,	6	Patrick Dunlevy, .	35	1	. .	Pine Brook shaft, ...	Scranton city, ...
27,	7	Martin Greeley, . .	40	1	11	No. 7 shaft, ...	Jenkins township, ...
Mar. 22,	8	Thomas McDonald,	47	1	7	No. 10 shaft, ...	Pittston borough, ...
31,	9	Thomas Hopkins, .	62	1	6	Pine Brook shaft, ...	Scranton city, ...
April 3,	10	Frederick Wilhelm	58	1	1	Bellevue shaft, ...	Lackawanna township, . . .
4,	11	Thomas McCarty, .	33	1	2	Cayuga shaft, ...	Providence, ...
28,	12	Thomas Hoskins, .	32	1	5	Everhart colliery, ...	Jenkins township, ...
28,	13	John Orr, ...	59	1	1	No. 6 slope, ...	Pittston township, ...
May 31,	14	Michael Foy, . . .	55	1	4	No. 4 slope, ...	Jenkins township, ...
June 5,	15	Michael Rowan, . .	35	1	7	Bellevue shaft, ...	Lackawanna township, . . .
7,	16	Bartley Dean, . . .	40	1	7	No. 6 slope, ...	Pittston township, ...
15,	17	James McShurley,	26	1	1	Cayuga shaft, ...	Providence, ...
25,	18	Patrick Gavan, . .	45	. .	. .	Filer colliery, ...	Winton, Blakely township, .
26,	19	Patrick Mulderrig,	52	1	6	No. 4 shaft, ...	Pittston borough, ...
26,	20	James Hagan, . . .	32	. .	. .	Fairlawn slope, ...	Scranton city, ...
July 2,	21	James Killbride, .	45	1	7	Dawson shaft, ...	Pleasant Valley borough, . .
2,	22	James Owens, . . .	13	. .	. .	Jermyn's slope, ...	Jermyn borough, ...
3,	23	Miles Boyd, ...	58	1	8	Elk Hill colliery, ...	Blakely township, ...
6,	24	John Brennan, . .	51	1	8	Coal Brook tunnel, . .	Carbondale City, ...
11,	25	William Alsop, . .	27	. .	. .	Filer colliery, ...	Winton, Blakely township, .
16,	26	William Williams,	63	1	3	No. 1 tunnel, ...	Pittston township, ...
16,	27	Richard Jackson, .	40	1	1	Twin shaft, ...	Pittston borough, ...
17,	28	John Richards, . .	41	1	7	Cayuga shaft, ...	Providence, ...

of the Eastern District of the Wyoming Coal Fields, Luzerne County, Pa., and Year ending the 31st day of December, A. D. 1877.

Cause of Death, and Remarks.	Number of Persons Killed.								Number of accident.
	Explosion of CH^2 gas.	Falls of roof and coal.	Falls down shafts.	Crushed by mine cars.	Explosion of powder.	Miscellaneous.	On surface.	Total.	
Killed by a large piece of coal sliding against him, knocking him down upon the bumper of a car, upon which he fell on his breast, dislodging the heart,	. .	. .	. .	. .	. .	1	. .	1	1
Killed by a fall of top coal: died in four hours after the accident,	. .	1	. .	. .	. .	. .	. .	1	2
Killed by a fall of roof; had discharged two props with a blast and neglected putting them up again,	. .	1	. .	. .	. .	. .	. .	1	3
Very severely injured by a fall of roof; spine injured, and shoulder and ankle dislocated; died February 13,	. .	1	. .	. .	. .	. .	. .	1	4
Back said to be broken by a fall of roof; died in about thirty days,	. .	1	. .	. .	. .	. .	. .	1	5
	. .	4	. .	. .	.	1	. .	5	
Killed by a fall of roof; Patrick McGetrick, the miner, had fired a blast to open a chamber on the gangway, and in their haste to clear the road they took no notice of the roof until it came down upon them, killing Dunlevy and dangerously injuring McGetrick,	. .	1	. .	. .	. .	. .	. .	1	6
Killed instantly by a fall of roof,	. .	1	. .	. .	. .	. .	. .	1	7
	. .	2	. .	. .	. .	. .	. .	2	
Killed instantly by a fall of roof,	. .	1	. .	. .	. .	. .	. .	1	8
Killed instantly by a fall of roof while trying to save Patrick Ruddy and John Daniels, who were injured by the first part of the fall,	. .	1	. .	. .	. .	. .	. .	1	9
	. .	2	. .	. .	. .	. .	. .	2	
Killed by culm car box tipping back, crushing him between the box and trestle railing at the breaker,	. .	.	. .	. .	. .	. .	1	1	10
Killed by a fall of roof; lived only until next day,	. .	1	. .	. .	. .	. .	. .	1	11
Killed instantly by a fall of top coal,	. .	1	. .	. .	. .	. .	. .	1	12
Fatally injured by a premature blast; died May 1, 1877,	. .	. .	. .	. .	. .	1	. .	1	13
	. .	2	. .	. .	. .	1	1	4	
Killed by a fall of roof; knowing that the piece was dangerous he still persisted in working under it,	. .	1	. .	. .	. .	. .	. .	1	14
Killed instantly by a fall of roof; result of inexcusable if not criminal neglect,	. .	1	. .	. .	. .	. .	. .	1	15
Killed instantly by a fall of roof; a prop had been discharged by a blast and had not been replaced,	. .	1	. .	. .	. .	. .	. .	1	16
Killed instantly by a fall of roof while assisting to re-stand a prop which was knocked out by a blast,	. .	1	. .	. .	. .	. .	. .	1	17
Killed by a fall of roof through neglect of his miner,	. .	1	. .	. .	. .	. .	. .	1	18
Killed instantly by a fall of roof; result of his own neglect,	. .	1	. .	. .	. .	. .	. .	1	19
Killed instantly by a fall of roof; result of his own neglect, which was encouraged by the general loose discipline of the mines,	. .	1	. .	. .	. .	. .	. .	1	20
	. .	6	. .	. .	. .	. .	. .	6	
Killed instantly by a fall of roof, which fell while he and Anthony Churchfield were re-standing a prop,	. .	1	. .	. .	. .	. .	. .	1	21
Killed instantly by being crushed by cars on a plane inside of the mine,	. .	. .	. .	1	. .	. .	. .	1	22
Killed instantly by a fall of top coal, through his own inexcusable carelessness,	. .	1	. .	. .	. .	. .	. .	1	23
Killed by a fall of roof, under which he ran after firing a blast regardless of his son's warning,	. .	1	. .	. .	. .	. .	. .	1	24
Killed instantly by a fall of top coal, which fell immediately after firing a blast,	. .	1	. .	. .	. .	. .	. .	1	25
Killed instantly by a fall of top coal,	. .	1	. .	. .	. .	. .	. .	1	26
Fatally injured in the breast, back and side by a fall of roof; died soon after,	. .	1	. .	. .	. .	. .	. .	1	27
Killed instantly by a fall of top coal; he had been warned of his danger by six different persons,	. .	1	. .	. .	. .	. .	. .	1	28
	. .	7	. .	1	. .	. .	. .	8	

TABLE No. 1—

DATE.	Number of accident.	NAME OF PERSON KILLED.	Age.	Widows.	Orphans.	NAME OF COLLIERY.	LOCATION OF COLLIERY.
Sept. 3,	29	Martin Hart, . . .	25	. .	. .	Twin shaft, ...	Pittston borough, ...
Oct. 3,	30	John Roberts, . . .	13	. .	. .	Seneca slope, ...	Pittston borough, ...
18,	31	Edward Calahan, .	14	. .	. .	Fairlawn slope, ...	Scranton city, ...
Nov. 5,	32	Michael Quinn, . .	35	1	3	Stark shaft, ...	Pleasant Valley borough, . .
13,	33	Michael Madden, .	50	1	7	Law shaft, ...	Pleasant Valley borough, . .
15,	34	Anthony Collins, .	19	. .	. .	Jermyn's Green R'ge sh't	Scranton city, ...
17,	35	George Batt, ...	41	1	7	Diamond, No. 2, shaft, .	Hyde Park, ...
17,	36	James Johnson, .	23	1	1	Diamond, No. 2, shaft, .	Hyde Park, ...
17,	37	Anthony Golden, .	16	. .	. .	Roaring Brook shaft, . .	Dunmore borough, ...
Dec. 1,	38	Michael Howard, .	52	1	7	Coal Brook tunnel, . . .	Carbondale City, ...
4,	39	Patrick Smith, . .	35	. .	. .	No. 12 shaft, ...	Pleasant Valley borough, . .
17,	40	Richard Joyce, . .	32	1	3	Greenwood colliery, . . .	Lackawanna township, . . .
		Totals, ...	. .	29	134	. . . . .	. . . . .

Continued.

CAUSE OF DEATH, AND REMARKS.	NUMBER OF PERSONS KILLED. Explosion of CH^3 gas.	Falls of roof and coal.	Falls down shafts.	Crushed by mine cars.	Explosion of powder.	Miscellaneous.	On surface.	Total.	Number of accident.
Killed by a fall of roof, under which he went regardless of repeated warnings,	..	1	..	..	..	..	..	1	29
Killed instantly by being shot by a blast through a pillar,	..	..	..	..	..	1	..	1	30
Killed by being smothered in culm pocket in the breaker,	..	..	..	..	..	..	1	1	31
	..	..	..	..	..	1	1	2	
Back broken by a fall of rock; died December 12, 1877,	..	1	..	..	..	..	..	1	32
Killed instantly by a fall of roof,	..	1	..	..	..	..	..	1	33
Skull fractured by being thrown against pillar by concussion of an explosion of CH^4 gas,	1	..	..	..	..	..	..	1	34
Both killed instantly by a fall of roof; a blast had just been fired, which knocked out two or three props, and other props were discharged by not being properly stood,	..	1	..	..	..	..	..	1	35
	..	1	..	..	..	..	..	1	36
Killed by being kicked in the stomach by a mule,	..	..	..	..	..	1	..	1	37
	1	4	..	..	..	1	..	6	
Killed instantly by a fall of roof,	..	1	..	..	..	..	..	1	38
Killed instantly by a fall of top coal,	..	1	..	..	..	..	..	1	39
Crushed under a car on plane at the breaker; died on the 22d, at the hospital,	..	..	..	..	..	..	1	1	40
	..	2	..	..	..	..	1	3	
	1	31	..	1	..	4	3	40	

TABLE No. 2.—List of non-fatal Accidents reported to the Inspector of the of each Accident as found by investigation, for the

DATE.	Number of accident.	NAME OF PERSON INJURED.	Age.	Wife.	Children.	NAME OF COLLIERY.	LOCATION OF COLLIERY.
Jan. 4,	1	John Hopkins, . .	15	.	.	Von Storch slope, ...	Providence, ...
5,	2	Michael Grant, . .	15	.	.	Hampton shaft, ...	Hyde Park, ...
9,	3	Christopher Riley,	31	.	.	No. 3 shaft, ...	Carbondale City, ...
16,	4	John Fagan, ...	40	1	5	Filer colliery, ...	Winton, Blakely township, . .
18,	5	John Malia, ...	15	.	.	No. 10 shaft, ...	Pittston borough, ...
20,	6	William Batten, . .	45	1	6	Leggett's Creek shaft, .	Providence, ...
20,	6	John McCullough,	30	1	3	Leggett's Creek shaft, .	Providence, ...
23,	7	John Foundation,	.	.	.	Phœnix shaft, ...	Pittston township, ...
24,	8	Jacob Schoster, . .	24	.	.	Sibley shaft, ...	Old Forge township, ...
29,	9	John Carding, . . .	16	.	.	Capouse shaft, ...	Hyde Park, ...
29,	10	John McDonough,	40	1	4	Gipsey Grove colliery, .	Dunmore borough, ...
29,	10	John Murray, . . .	35	1	5	Gipsey Grove colliery, .	Dunmore borough, ...
31,	11	William Rees, . . .	.	.	.	Pine Brook shaft, ...	Scranton city, ...
eb. 2,	12	Thomas Mehan, .	16	.	.	Bellevue shaft, ...	Lackawanna township, ...
9,	13	James Toole, . . .	20	.	.	School Fund Ass'n slope,	Hyde Park, ...
12,	14	Patrick McGetrick,	35	.	.	Pine Brook shaft, . . .	Scranton city, ...
19,	15	Charles Cosgrove, .	14	.	.	No. 6 shaft, ...	Jenkins township, ...
19,	16	Michael Mulderig,	22	.	.	Greenwood colliery, . .	Lackawanna township, ...
21,	17	Patrick McDonald,	16	.	.	Greenwood colliery, . .	Lackawanna township, ...
22,	18	Frederick Schmaltz	47	1	6	No. 8 shaft, ...	Pittston township, ...
Mar. 1,	19	George Doyle, . . .	50	.	.	Ravine shaft, ...	Pittston borough, ...
6,	20	Thomas Davies, . .	14	.	.	Winton slope, ...	Winton, Blakely township, .
6,	21	Thomas Lewis, . .	.	.	.	Pine Brook shaft, ...	Scranton city, ...
19,	22	Michael O'Malia, .	14	.	.	National colliery, ...	Lackawanna township, ...
23,	23	James Ferrick, . .	40	1	4	Butler shaft, ...	Pittston township, ...
23,	24	Owen Valley, . . .	28	.	1	Seneca slope, ...	Pittston borough, ...
23,	25	John McHale, . . .	21	.	.	Grassy Island shaft, . .	Olyphant, Blakely township, .
26,	26	Patrick Loftus, . .	26	.	.	Green Ridge slope, . . .	Dunmore borough, ...
28,	27	Benjamin Jones, .	23	.	.	Sloan shaft, ...	Lackawanna township, ...
31,	28	John Daniels, . .	25	.	.	Pine Brook shaft, ...	Scranton city, ...
31,	28	Patrick Ready, . .	40	1	2	Pine Brook shaft, ...	Scranton city, ...
31,	29	Jonah Lloyd, . . .	28	1	2	Bellevue shaft, ...	Lackawanna township, ...
31,	29	Thomas Davies, . .	22	1	.	Bellevue shaft, ...	Lackawanna township, ...
31,	30	Thomas Daley, . .	35	1	5	No. 9 shaft, ...	Pittston borough, ...
Apr. 10,	31	Martin Hefferon, .	.	.	.	No. 6 shaft, ...	Jenkins township, ...
10,	31	William Reynolds,	62	1	3	No. 6 shaft, ...	Jenkins township, ...
12,	32	John Ferguson, . .	14	.	.	Pine Brook shaft, ...	Scranton city, ...
13,	33	Patrick Malia, . . .	14	.	.	No. 3 shaft, ...	Carbondale City, ...
14,	34	John Farrell, . . .	.	.	.	Phœnix shaft, ...	Pittston township, ...
17,	35	James R. McHale,	27	.	.	Eddy Creek shaft, . . .	Olyphant, Blakely township, .
17,	36	Dominick Haley, .	18	.	.	Meadow Brook shaft, . .	Scranton city, ...
17,	37	James Martin, . . .	.	.	.	No. 13 shaft, ...	Pleasant Valley borough, . . .
20,	38	John Martin, . . .	32	1	4	No. 9 shaft, ...	Pittston borough, ...
20,	39	James Coon, ...	35	1	6	Green Ridge slope, . . .	Dunmore borough, ...
23,	40	Frank Kelly, . . .	40	.	.	Meadow Brook shaft, . .	Scranton city, ...

Eastern District of the Wyoming Coal Fields, Luzerne County, Pa., and cause year ending the 31st day of December, A. D. 1877.

EXTENT OF INJURY, AND CAUSE OF ACCIDENT.	Explosion of CH^4 gas.	Falls of roof and coal.	Falls down shafts.	Crushed by mine cars.	Explosion of powder.	Miscellaneous.	On surface.	Totals.	Number of accident.
Collar bone broken by falling under cars,	.	.	.	1	.	.	.	1	1
Crushed between a car and a pillar while trying to unhitch his mule from the car,	.	.	.	1	.	.	.	1	2
Back and head severely injured by premature explosion of a blast,	.	.	.	.	1	.	.	1	3
Head and arm cut by a piece of coal which fell from top coal,	.	1	.	.	.	.	.	1	4
Back injured by being run over by mine car,	.	.	.	1	.	.	.	1	5
Both men burned severely on face, hands, arms, and back, by an explosion of carbureted hydrogen gas, caused by leaving their naked lights in the return air-way while brushing out the gas from their chambers,	1	.	.	.	.	.	.	1	6
	1	.	.	.	.	.	.	1	6
Face and hands slightly burned by an explosion of carbureted hydrogen gas,	1	.	.	.	.	.	.	1	7
Hands slightly burned by an explosion of powder,	.	.	.	.	1	.	.	1	8
Leg broken by a mule falling with him while riding from the mines to the barn,	.	.	.	.	.	.	1	1	9
Leg broken and otherwise injured by being crushed between two cars,	.	.	.	1	.	.	.	1	10
Knee injured by same cause and at the same time,	.	.	.	1	.	.	.	1	10
Face and hands burned by an explosion of carbureted hydrogen gas,	1	.	.	.	.	.	.	1	11
	4	1	.	5	2	.	1	13	
Severely injured by a fall of roof,	.	1	.	.	.	.	.	1	12
Three toes badly crushed by being run over by a mine car,	.	.	.	1	.	.	.	1	13
Back severely injured by a fall of roof,	.	1	.	.	.	.	.	1	14
Kicked in the breast by a mule while putting on the harness,	.	.	.	.	.	1	.	1	15
Two fingers cut off by being run over by a mine car,	.	.	.	1	.	.	.	1	16
Hip and side severely injured by being crushed between a car and prop,	.	.	.	1	.	.	.	1	17
Arm, hand, and foot, cut by a fall of roof,	.	1	.	.	.	.	.	1	18
	.	3	.	3	.	1	.	7	
Leg broken by a fall of roof,	.	1	.	.	.	.	.	1	19
Arm cut by falling while oiling the screens in the breaker,	.	.	.	.	.	.	1	1	20
Ankle sprained by a fall of roof,	.	1	.	.	.	.	.	1	21
Severe flesh wound in leg, received by mule falling on him when going to the barn,	.	.	.	.	.	.	1	1	22
Back slightly injured and face cut by a fall of roof,	.	1	.	.	.	.	.	1	23
Body bruised by a fall of roof,	.	1	.	.	.	.	.	1	24
Leg broken and arm broken in three places, and head badly cut by a fall of roof,	.	1	.	.	.	.	.	1	25
Face and hands slightly burned by an explosion of carbureted hydrogen gas,	1	.	.	.	.	.	.	1	
Spine severely injured by a fall of roof; disabled for life,	.	1	.	.	.	.	.	1	
Leg broken by a fall of roof,	.	1	.	.	.	.	.	1	
Severely bruised by the same fall of roof,	.	1	.	.	.	.	.	1	28
Face and hands burned by an explosion of carbureted hydrogen gas,	1	.	.	.	.	.	.	1	29
Face and hands burned by the same explosion,	1	.	.	.	.	.	.	1	29
Hip slightly injured by a fall of roof,	.	1	.	.	.	.	.	1	30
	3	9	.	.	.	.	2	14	
Face, arms, and body, severely burned by an explosion of carbureted hydrogen gas,	1	.	.	.	.	.	.	1	
Face, arms, and body, seriously burned by the same explosion,	1	.	.	.	.	.	.	1	31
Leg broken by being crushed by a mine car while attempting to sprag it,	.	.	.	1	.	.	.	1	31
Body severely bruised by being crushed between a car and a pillar,	.	.	.	1	.	.	.	1	32
Slightly injured by a fall of roof,	.	1	.	.	.	.	.	1	33
Slightly injured by a fall of roof,	.	1	.	.	.	.	.	1	34
Hand crushed between top railing of car and a piece of coal which rubbed against the roof,	.	.	.	.	.	1	.	1	35
Side and shoulder injured by a fall of roof,	.	1	.	.	.	.	.	1	36
Back and breast injured by a fall of roof,	.	1	.	.	.	.	.	1	37
Slightly injured by an explosion of a blast which had hung fire,	.	.	.	.	1	.	.	1	38
Collar-bone fractured by falling off the carriage at the foot of the shaft,	.	.	.	.	.	1	.	1	39

TABLE No. 2—

DATE.	Number of accident.	NAME OF PERSON INJURED.	Age.	Wife.	Children.	NAME OF COLLIERY.	LOCATION OF COLLIERY.
Apr. 25,	41	Henry Thomas, . .	13	. .	. .	Capouse shaft, ...	Hyde Park, ...
27,	42	Michael Dempsy, .	17	. .	. .	No. 2 slope, ...	Dunmore borough, ...
27,	43	Martin Cannon, . .	40	1	5	Eddy Creek shaft, ...	Olyphant, Blakely township, .
30,	44	John Fallen, ...	16	. .	. .	Roaring Brook shaft, . .	Dunmore borough, ...
May 1,	45	James Nute, ...	35	1	4	Filer colliery, ...	Winton, Blakely township, .
7,	46	Patrick Roney, . .	32	. .	. .	Von Storch slope, ...	Providence, ...
8,	47	John Timlin, . . .	44	1	7	Von Storch slope, ...	Providence, ...
8,	48	John Durkin, . . .	35	1	2	Eaton colliery, ...	Archbald, Blakely township,
12,	49	Rees Morgans, . . .	45	1	6	Coal Brook tunnel, . . .	Carbondale City, ...
12,	50	Michael Philbert, .	15	. .	. .	Phinney mines, ...	Lackawanna township, ...
16,	51	Thomas Lanning, .	49	1	2	Brisbin shaft, ...	Providence, ...
23,	52	John Collins, . .	50	1	. .	Filer colliery, ...	Winton, Blakely township, .
24,	53	Thomas J. Williams	16	. .	. .	Ravine shaft, ...	Pittston borough, ...
29,	54	Patrick Mahon, . .	40	1	3	Meadow Brook tunnel, .	Scranton city, ...
31,	55	Terrance Brennan,	36	1	4	No. 8 shaft, ...	Pittston township, ...
June 4,	56	Richard Ruddy, . .	16	.	. .	Roaring Brook shaft, . .	Dunmore borough, ...
6,	57	David Watkins, . .	25	1	3	Bellevue shaft, ...	Lackawanna township, ...
6,	57	Patrick Duffy, . . .	32	1	3	Bellevue shaft, ...	Lackawanna township, ...
6,	58	John Eynon, ...	40	1	2	Hampton shaft, ...	Hyde Park, ...
6,	58	John R. Morris, . .	35	1	2	Hampton shaft, ...	Hyde Park, ...
6,	58	Michael Lavelle, .	21	.	. .	Hampton shaft, ...	Hyde Park, ...
6,	59	Thomas McCrindle,	47	1	8	Dawson shaft, ...	Pleasant Valley borough, . . .
6,	60	David Chelton, . .	16	.	. .	No. 3 shaft, ...	Carbondale City, ...
7,	61	James Jordan, . . .	30	1	3	No. 6 slope, ...	Pittston township, ...
7,	62	David D. Thomas,	55	1	4	Diamond shaft, ...	Hyde Park, ...
7,	63	William Kennedy,	32	1	4	Mount Pleasant slope, .	Hyde Park, ...
8,	64	James Short, ...	15	. .	. .	Green Ridge shaft, . . .	Scranton city, ...
8,	65	Edward Ramage, .	18	. .	. .	No. 9 shaft, ...	Pittston borough, ...
11,	66	Owen McCrew, . .	55	1	3	Leggett's Creek shaft, .	Providence, ...
11,	67	James Welsh, . . .	40	1	5	No. 6 shaft, ...	Jenkins township, ...
12,	68	Edward Burke, . .	28	. .	. .	No. 2 slope, ...	Jenkins township, ...
15,	69	William J. Morgan,	27	1	1	Cayuga shaft, ...	Providence, ...
16,	70	Edward Galavan, .	38	1	3	Filer colliery, ...	Winton, Blakely township, . .
16,	71	John Dondale, . . .	48	1	7	Fair Lawn slope, ...	Scranton city, ...
18,	72	Peter Lynott, . . .	16	. .	. .	Leggett's Creek shaft, .	Providence, ...
20,	73	Michael McCrea,	9	. .	. .	Greenwood colliery, . .	Lackawanna township, ...
29,	74	Anthony Judge, . .	35	1	4	Green Ridge slope, . . .	Dunmore borough, ...
July 2,	75	Anth'y Churchfield	35	1	2	Dawson shaft, ...	Pleasant Valley borough, . . .
5,	76	Thomas Harrison,	20	. .	. .	Meadow Brook shaft, . .	Scranton city, ...
6,	77	Thomas Joyce, . .	30	. .	. .	No. 9 shaft, ...	Pittston borough, ...
9,	78	Casper Wright, . .	40	1	. .	Phœnix shaft, ...	Pittston township, ...
11,	79	John N. Burke, . .	40	1	5	Hillside colliery, ...	Pleasant Valley borough, . . .
11,	80	Sabbath Williams,	38	1	2	No. 7 shaft, ...	Jenkins township, ...
11,	81	Timothy Welsh, . .	16	. .	. .	Meadow Brook shaft, . .	Scranton city, ...

Continued.

EXTENT OF INJURY, AND CAUSE OF ACCIDENT.	Explosion of CH^4 gas.	Falls of roof and coal.	Falls down shafts.	Crushed by mine cars.	Explosion of powder.	Miscellaneous.	On surface.	Totals.	Number of accident.
Leg broken and head and body fearfully shocked by falling out of the breaker,	..	..	..	..	..	..	1	1	41
Face cut by a kick from a mule,	..	..	..	..	..	1	..	1	42
Hands and neck slightly burned by an explosion of carbureted hydrogen gas,	1	..	..	..	..	..	..	1	43
Hips and sides severely injured by being crushed between a car and pillar,	..	..	..	1	..	..	..	1	44
	3	4	..	3	1	3	1	15	
Arm broken and otherwise slightly injured by a fall of roof,	..	1	..	..	..	..	..	1	45
Foot badly cut by lump of coal falling on it from top of car,	..	..	..	..	..	1	..	1	46
Head cut and back severely bruised by a fall of roof,	..	1	..	..	..	..	..	1	47
Head severely cut by a piece of coal flying from a collision of two cars,	..	..	..	..	..	1	..	1	48
Hips and loin badly injured by being squeezed between cars and pillar,	..	..	..	1	..	..	..	1	49
Leg fearfully mangled by falling under culm car at the breaker; leg amputated,	..	..	..	..	..	..	1	1	50
Leg and arm broken, and otherwise severely injured by a fall of top coal,	..	1	..	..	..	..	..	1	51
Leg sprained at the ankle by a fall of top coal,	..	1	..	..	..	..	..	1	52
Seriously crushed between a car and a prop,	..	..	..	1	..	..	..	1	53
Slightly injured by an explosion of a blast; returned before the match had burned out,	..	..	..	..	..	1	..	1	54
Collar-bone fractured by being crushed between a car and pillar,	..	..	..	1	..	..	..	1	55
	..	4	..	3	..	2	1	11	
Leg broken by being crushed between mine cars,	..	..	..	1	..	..	..	1	56
Head severely cut by a fall of roof,	..	1	..	..	..	..	..	1	57
Leg injured by the same fall of roof,	..	1	..	..	..	..	..	1	57
Back broken by a fall of roof; Eynon is disabled for life,	..	1	..	..	..	..	..	1	58
Upper jaw-bone and nose broken by same fall of roof,	..	1	..	..	..	..	..	1	58
Back injured by the same fall of roof,	..	1	..	..	..	..	..	1	58
Thigh-bone fractured by a fall of roof, which occurred immediately after firing a blast,	..	1	..	..	..	..	..	1	59
Body squeezed between a car-load of props and the roof,	..	..	..	1	..	..	..	1	60
Back seriously injured by a fall of roof, by which Bartley Dean was killed,	..	1	..	..	..	..	..	1	61
Ankle fractured by barring down coal upon himself,	..	..	..	..	..	1	..	1	62
Back very severely injured by a fall of roof; result of his own carelessness,	..	1	..	..	..	..	..	1	63
Head and leg cut by being crushed between cars,	..	..	..	1	..	..	..	1	64
Head and shoulder injured by a fall of roof,	..	1	..	..	..	..	..	1	65
Face and hands slightly burned by an explosion of carbureted hydrogen gas,	1	..	..	..	..	..	..	1	66
Head cut and breast injured by a fall of roof,	..	1	..	..	..	..	..	1	67
Leg severely cut above the knee by a fall of roof,	..	1	..	..	..	..	..	1	68
Head and arm severely cut and hips sprained by a fall of roof; his laborer, James McShurley, was killed,	..	1	..	..	..	..	..	1	69
Ankle dislocated by a fall of roof,	..	1	..	..	..	..	..	1	70
Back injured and two teeth knocked out by a fall of roof,	..	1	..	..	..	..	..	1	71
Slightly injured by a kick from a mule,	..	..	..	..	..	1	..	1	72
Two toes cut off in the cogs of the screen in the breaker,	..	..	..	..	..	..	1	1	73
Leg broken by jumping off a trip of loaded cars upon which he was riding on inside slope,	..	..	..	1	..	..	..	1	74
	1	14	..	4	..	2	1	22	
Back and sides injured by a fall of roof while re-standing a prop knocked out by a blast,	..	1	..	..	..	..	..	1	75
Leg injured by being crushed between bumpers of mine cars,	..	..	..	1	..	..	..	1	76
Face, neck, and hands slightly burned by an explosion of carbureted hydrogen gas,	1	..	..	..	..	..	..	1	77
Slightly injured by a fall of roof,	..	1	..	..	..	..	..	1	78
Right side injured by premature explosion of a blast,	..	..	..	..	1	..	..	1	79
Breast and body injured by premature explosion of a blast,	..	..	..	..	1	..	..	1	80
Body injured between mine cars,	..	..	..	1	..	..	..	1	81

TABLE No. 2—

DATE.	Number of accident.	NAME OF PERSON INJURED.	Age.	Wife.	Children.	NAME OF COLLIERY.	LOCATION OF COLLIERY.
July 12,	82	Michael Sullivan,	35	1	4	Taylor shaft,	Lackawanna township,
14,	83	Benjamin Hughes,	35	1	3	Pine Brook shaft,	Scranton city,
16,	84	Thomas Ratchford,	30	1	2	Phœnix shaft,	Pittston township,
16,	84	James Hall,	25	1		Phœnix shaft,	Pittston township,
16,	84	Barney Griffin,	35	1	3	Phœnix shaft,	Pittston township,
18,	85	Patrick Malia,	34	1	1	Twin shaft,	Pittston borough,
19,	86	Austin Nevin,	30	1	1	Twin shaft,	Pittston borough,
20,	87	Michael Welsh,	50			No. 9 shaft,	Pittston borough,
24,	88	John McManaman,	15			No. 4 slope,	Jenkins township,
25,	89	Dominick Lacken,	14			No. 1 shaft,	Carbondale City,
27,	90	Henry Padley,	15			Von Storch slope,	Providence,
27,	91	Elmer Helmes,	17			Butler shaft,	Pittston township,
Aug. 29,	92	William Polly,	32	1	3	Seneca slope,	Pittston borough,
31,	93	William Reese,	23	1	1	Green Ridge shaft,	Scranton city,
Sept. 19,	94	John Saltry,				Hancock mines,	Providence,
Oct. 10,	95	William Keating,	42	1	6	No. 9 shaft,	Pittston borough,
12,	96	John Hastings,				No. 4 slope,	Jenkins township,
20,	97	William H. Rule,	35	1	6	Green Ridge shaft,	Scranton city,
20,	98	Thomas Fox,	40	1	6	Green Ridge shaft,	Scranton city,
24,	99	Patrick Lynch,	40	1	5	Gipsey Grove colliery,	Dunmore borough,
26,	100	Hugh Kennedy,	35	1	2	Von Storch slope,	Providence,
27,	101	Thomas Meehan,	35	1	5	No. 11 shaft,	Jenkins township,
30,	102	John Alexander,	27	1	2	Von Storch slope,	Providence,
Nov. 2,	103	John Gurbie,				Jermyn's slope,	Jermyn borough,
2,	103	Richard Klopfer,				Jermyn's slope,	Jermyn borough,
3,	104	Anthony Barrett,	16			Gipsey Grove colliery,	Dunmore borough.
5,	105	Thomas Delaney,	39	1	1	No. 6 shaft,	Jenkins township,
6,	106	G. W. Thomas,	27	1	2	Pyne shaft,	Old Forge township,
8,	107	Thomas Wayman,	15			No. 1 shaft,	Carbondale City,
9,	108	John Foy,	14			Continental shaft,	Lackawanna township,
10,	109	John Kearney,	16			Mount Pleasant slope,	Hyde Park,
12,	110	Michael Brown,	14			No. 9 shaft,	Pittston borough,
13,	111	James Tomlinson,	25	1	1	Twin shaft,	Pittston borough,
14,	112	Edward Simons,	13			Mount Pleasant slope,	Hyde Park,
14,	113	Martin Tool,	35	1	3	Greenwood colliery,	Lackawanna township,
15,	114	August Kritz,	12			Diamond mines,	Hyde Park,
15,	115	Maux Phillips,	41	1	6	Green Ridge shaft,	Scranton city,
15,	115	Gotlieb Mondt,	39	1	3	Green Ridge shaft,	Scranton city,
15,	115	Patrick Barnes,	35	1	4	Green Ridge shaft,	Scranton city,
15,	115	William Lanyon,	22	1	1	Green Ridge shaft,	Scranton city,
15,	115	Luke Burns,	14			Green Ridge shaft,	Scranton city,
15,	115	J. W. McPeake,	13			Green Ridge shaft,	Scranton city,
16,	116	Patrick Malia,	40	1	5	No. 10 shaft,	Pittston borough,
16,	117	Miles Cawley,	30	1	1	Von Storch slope,	Providence,
20,	118	John Burke,	50			Filer colliery,	Winton, Blakely township,
23,	119	John Owens,	16			Mount Pleasant slope,	Hyde Park,

Continued.

Extent of Injury, and Cause of Accident.	Explosion of CH^3 gas.	Falls of roof and coal.	Falls down shafts.	Crushed by mine cars.	Explosion of powder.	Miscellaneous.	On surface.	Totals.	Number of accident.
Slightly injured by a fall of roof,	..	1	..	..	..	..	..	1	82
Face and hands burned by an explosion of carbureted hydrogen gas	1	..	..	..	..	..	..	1	83
Face, neck, and hands, of each of these men were slightly burned by an explosion of carbureted hydrogen gas, or rather from setting fire to a "blower;" they fired the gas three times within an hour, and finally succeeded in giving themselves a warming,	1	..	..	..	..	..	..	1	84
	1	..	..	..	..	..	..	1	84
	1	..	..	..	..	..	..	1	84
Slightly injured by a fall of roof,	..	1	..	..	..	..	..	1	85
Head severely cut by a fall of roof,	..	1	..	..	..	..	..	1	86
Shoulder and foot severely bruised by a fall of roof,	..	1	..	..	..	..	..	1	87
Side injured by falling under mine cars,	..	..	..	1	..	..	..	1	88
Arm broken in two places by falling under a trip of mine cars,	..	..	..	1	..	..	..	1	89
Slightly injured by being crushed by mine cars,	..	..	..	1	..	..	..	1	90
Foot crushed—one toe cut off—by being caught under a sprag in car,	..	..	..	1	..	..	..	1	91
	5	6	..	6	2	..	..	19	
Slightly injured by a fall of coal,	..	1	..	..	..	..	..	1	92
Leg broken by "T iron rail" falling on him,	..	..	..	..	..	1	..	1	93
	..	1	..	..	..	1	..	2	
Leg broken by a fall of roof,	..	1	..	..	..	..	..	1	94
Head severely cut by a fall of roof,	..	1	..	..	..	..	..	1	95
Back slightly injured by a fall of top coal,	..	1	..	..	..	..	..	1	96
Back slightly injured by a fall of roof,	..	1	..	..	..	..	..	1	97
Back seriously injured and leg broken by a fall of roof,	..	1	..	..	..	..	..	1	98
Body bruised by a fall of roof,	..	1	..	..	..	..	..	1	99
Leg severely cut by a fall of coal,	..	1	..	..	..	..	..	1	100
Face burned by an explosion of carbureted hydrogen gas,	1	..	..	..	..	..	..	1	101
Head slightly injured by a fall of roof,	..	1	..	..	..	..	..	1	102
	1	7	..	..	..	..	..	8	
Leg broken by a fall of roof,	..	1	..	..	..	..	..	1	103
Two ribs fractured and otherwise cut and bruised by same fall of roof,	..	1	..	..	..	..	..	1	103
Severe scalp wound by falling under a car,	..	..	..	1	..	..	..	1	104
Ankle dislocated and arm and face bruised by a fall of roof,	..	1	..	..	..	..	..	1	105
Body squeezed by being caught between locomotive tank and the breaker,	..	..	..	..	..	..	1	1	106
Legs badly injured by mine car tipping over on him,	..	..	..	1	..	..	..	1	107
Head cut by falling under a mine car,	..	..	..	1	..	..	..	1	108
Injured by cars running against him on a run in the mine,	..	..	..	1	..	..	..	1	109
Head jammed between cars when in the act of coupling them,	..	..	..	1	..	..	..	1	110
Slightly injured by a fall of roof,	..	1.	..	..	..	..	..	1	111
Knee terribly crushed by being caught in a screen in the breaker; leg amputated,	..	..	..	..	..	..	1	1	112
Hand, neck, and face burned by an explosion of powder in cartridge	..	..	..	..	1	..	..	1	113
Leg broken and foot crushed by mule jumping upon him,	..	..	..	..	..	1	..	1	114
Face, hands, and body severely burned by an explosion of carbureted hydrogen gas,	1	..	..	..	..	..	..	1	115
Face, hands, and body severely burned by an explosion of carbureted hydrogen gas,	1	..	..	..	..	..	..	1	115
Back, side, and hand injured by being violently thrown by concussion of same explosion of gas,	1	..	..	..	..	..	..	1	115
Ankle sprained by being thrown by same concussion of same explosion of gas,	1	..	..	..	..	..	..	1	115
Right leg terribly cut by being thrown under a car by same concussion,	1	..	..	..	..	..	..	1	115
Back, arm, and eye injured by being thrown against a pillar by same concussion,	1	..	..	..	..	..	..	1	115
Neck and arms burned by an explosion of powder while making a cartridge,	..	..	..	..	1	..	..	1	116
Arm cut and two fingers smashed by a fall of top coal,	..	1	..	..	..	..	..	1	117
Arm broken by a fall of roof,	..	1	..	..	..	..	..	1	118
Scalp wound by striking his head against the roof while riding his mule to the stable,	..	..	..	..	..	1	..	1	119

TABLE No. 2—

DATE.	Number of accident.	NAME OF PERSON INJURED.	Age.	Wife.	Children.	NAME OF COLLIERY.	LOCATION OF COLLIERY.
Nov.24,	120	Thomas Owens, . .	50	1	7	No. 10 shaft, ...	Pittston borough, ...
24,	121	John Kelley, ...	40	1	5	No. 10 shaft, ...	Pittston borough, ...
26,	122	Patr'k McAndrews	33	1	1	No. 12 shaft, ...	Pleasant Valley borough, . .
26,	123	Thomas McGrath, .	15	. .	. .	Continental shaft, . . .	Lackawanna township, . . .
28,	124	Benjamin Davies, .	16	. .	. .	Continental shaft, . . .	Lackawanna township, . . .
28,	125	Patrick Runey, . .	45	1	3	Greenwood colliery, . .	Lackawanna township, . . .
28,	126	George Hill, ...	40	1	6	Tompkins' shaft, ...	Pittston borough, ...
29,	127	William Abbott, .	. .	. .	. .	No. 10 shaft, ...	Pittston borough, ...
29,	127	John Cowan, . . .	. .	. .	. .	No. 10 shaft, ...	Pittston borough, ...
29,	127	William Mitchell, .	. .	. .	. .	No. 10 shaft, ...	Pittston borough, ...
30,	128	Michael Galagher,	40	1	4	No. 1 shaft, ...	Carbondale City, ...
Dec. 1,	129	Martin Walsh, . . .	20	. .	. .	Greenwood colliery, . .	Lackawanna township, . . .
4,	130	Joseph D. Lewis, .	15	. .	. .	Bellevue slope, ...	Lackawanna township, . . .
4,	131	Thomas Sharp, . .	40	. .	. .	Meadow Brook shaft, . .	Scranton city, ...
4,	131	James Leonard, . .	25	. .	. .	Meadow Brook shaft, . .	Scranton city, ...
4,	132	John Leyshon, . .	32	. .	. .	Capouse shaft, ...	Hyde Park, ...
6,	133	Thomas McNally, .	30	1	3	Bellevue shaft, ...	Lackawanna township, . . .
6,	134	Owen McCrew, . .	55	. .	2	Leggett's Creek shaft, .	Providence, ...
4,	135	David D. Thomas,	60	1	5	Diamond mines, ...	Hyde Park, ...
8,	136	David Mulchrene, .	33	1	3	Leggett's Creek shaft, .	Providence, ...
12,	137	Lewis Tishler, . . .	22	. .	. .	No. 10 shaft, ...	Pittston borough, ...
12,	138	William Mowry, .	15	. .	. .	Roaring Brook shaft, . .	Dunmore borough, ...
12,	139	Martin Haley, . . .	25	. .	. .	No. 1 shaft, ...	Carbondale City, ...
13,	140	David Evans, . . .	12	. .	. .	Sloan shaft, ...	Lackawanna township, . . .
13,	141	Morgan Powell, . .	53	1	3	Leggett's Creek shaft, .	Providence, ...
13,	142	James Gill, ...	48	1	5	Coal Brook tunnel, . . .	Carbondale City, ...
14,	143	James O'Boyle, . .	37	1	4	No. 6 slope, ...	Pittston township, ...
14,	143	William Bollen, . .	37	1	2	No. 6 slope, ...	Pittston township, ...
15,	144	Thomas Williams,	13	. .	. .	Diamond mines, ...	Hyde Park, ...
18,	145	Joseph Fadden, . .	16	. .	. .	Bellevue shaft, ...	Lackawanna township, . . .
19,	146	Patrick O'Hara, . .	24	1	1	Roaring Brook shaft, . .	Dunmore borough, ...
20,	147	James Oliver, jr., .	13	. .	. .	Hampton shaft, ...	Hyde Park, ...
21,	148	Patrick Connors, .	14	. .	. .	Brisbin shaft, ...	Providence, ...
21,	149	Alfred Peddle, . .	14	. .	. .	Von Storch slope, ...	Providence, ...
22,	150						
22,	151	Morgan Sweeney, .	15	. .	. .	Meadow Brook tunnel, .	Scranton city, ...
		Sarah Conway, . .	55	. .	. .	Diamond mines, ...	Hyde Park, ...
24,	152	Joseph Chambers, .	14	. .	. .	Brisbin shaft, ...	Providence, ...
24,	153	Patrick McCormick	35	1	2	Taylor shaft, ...	Lackawanna township, . . .
29,	154	Richard Harris, . .	36	1	4	Bellevue slope, ...	Lackawanna township, . . .

Continued.

Extent of Injury, and Cause of Accident.	Explosion of C. H² gas.	Falls of roof and coal.	Falls down shafts.	Crushed by mine cars.	Explosion of powder.	Miscellaneous.	On surface.	Totals.	Number of accident.
Face burned by an explosion of a cartridge which he was carrying to charge a hole	..	..	..	..	1	..	..	1	120
Shoulder dislocated and two ribs fractured by a fall of roof	..	1	..	..	..	..	..	1	121
Arms and hands slightly burned by an explosion of carbureted hydrogen gas	1	..	..	..	..	..	..	1	122
Face badly cut and ear severed by a kick from a mule	..	..	..	..	..	1	..	1	123
Face severely cut by falling under a mine car	..	..	..	1	..	..	..	1	124
Body severely burned by an explosion of a keg of powder while making a cartridge	..	..	..	..	1	..	..	1	125
Hip injured by being struck with a piece of coal from a blast	..	..	..	..	..	1	..	1	126.
Head and hands severely burned by an explosion of carbureted hydrogen gas	1	..	..	..	..	..	..	1	127
Head, hands, arms, and body severely burned by the same explosion	1	..	..	..	..	..	..	1	127
Head, hands, and arms severely burned by the same explosion	1	..	..	..	..	..	..	1	127
Body badly bruised by a fall of roof	..	1	..	..	..	..	..	1	128
	10	8	..	6	4	4	2	34	
Ankle dislocated and foot cut by a runaway car, which he was trying to stop	..	..	..	1	..	..	..	1	129
Leg fearfully mangled by falling under a mine car; amputated	..	..	..	1	..	..	..	1	130
Cut in the head, and body bruised by a blast through a pillar fired by John Cotswinker	..	..	..	..	..	1	..	1	131
Cut in the head, and otherwise injured by same cause	..	..	..	..	..	1	..	1	131
Leg severely cut by blast through pillar fired by Henry Morgan without warning	..	..	..	..	..	1	..	1	132
Face and hands burned by an explosion of carbureted hydrogen gas	1	..	..	..	..	..	..	1	133
Head and shoulder severely injured by premature explosion of a blast	..	..	..	..	1	..	..	1	134
Severely injured by a fall of coal; accident not reported for over a week	..	1	..	..	..	..	..	1	135
Hand severely cut—one finger cut off—by a piece of coal which fell from the top while he was barring it down	..	1	..	..	..	..	..	1	136
Face, hands, arms, and body, burned by an explosion of half keg of powder while making a cartridge	..	..	..	..	1	..	..	1	137
Head severely cut by being caught between top of a car and the roof	..	..	..	1	..	..	..	1	138
Thumb cut off by a piece of coal which he was lifting into a car	..	..	..	..	..	1	..	1	139
Four teeth kicked out by a mule	..	..	..	..	..	1	..	1	140
Severely injured inwardly by a fall of roof	..	1	..	..	..	..	..	1	141
Back injured by a fall of roof	..	1	..	..	..	..	..	1	142
Arm broken and slightly burned by an explosion of a cartridge while tamping a hole	..	..	..	..	1	..	..	1	143
Burned and bruised severely by the same cause	..	..	..	..	1	..	..	1	143
Leg broken and flesh fearfully mangled by falling under a loaded mine car	..	..	..	1	..	..	..	1	144
Shoulder dislocated by being knocked off his mule by a brace in the breaker tower	..	..	..	..	..	..	1	1	145
Collar-bone fractured and head cut by a fall of roof	..	1	..	..	..	..	..	1	146
Thigh fractured by being crushed between a car and a pillar	..	..	..	1	..	..	..	1	147
Face cut by a kick from a mule which he was playing with at the barn	..	..	..	..	..	..	1	1	148
Head and leg injured by being crushed by cars	..	..	..	1	..	..	..	1	149
Arm broken in two places by falling under loaded mine cars	..	..	..	1	..	..	..	1	150
Both legs fearfully injured by being run over by about eighty coal cars near the breaker	..	..	..	..	..	..	1	1	151
Leg severely cut by being run over by mine car	..	..	..	1	..	..	..	1	152
Leg slightly injured by a fall of top coal	..	1	..	..	..	..	..	1	153
Side severely injured by returning to a blast too soon, which exploded just as he got to it	..	..	..	..	..	1	..	1	154
	1	6	..	8	4	6	3	28	

TABLE No. 3.—*Number of persons killed and injured, and causes of accidents, in the Eastern District of the Wyoming Coal Fields, Luzerne county, Pa., during the years 1872-3-4-5-6-7.*

Cause of the Accidents.	1872.		1873.		1874.		1875.		1876.		1877.		Totals.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Explosion of CH^2 gas,	5	24	. . .	. . .	6	10	3	1	6	21	1	28	21	84
Falls of roof,	19	43	. . .	. . .	26	26	18	20	16	29	24	55	103	173
Falls of coal,	17	25	. . .	. . .	13	8	11	25	4	15	7	9	52	82
Falling down shafts,	4	3	. . .	. . .	1	2	1	2	2	. . .	. . .	. . .	8	7
Explosions of blasting powder,	7	6	. . .	. . .	. . .	3	1	10	3	12	. . .	7	11	38
Premature blasts,	. . .	21	. . .	. . .	6	13	10	5	. . .	. . .	1	7	17	46
Crushed by mine cars,	8	40	. . .	. . .	13	18	12	15	9	19	1	38	43	130
Miscellaneous under ground,	1	15	. . .	. . .	2	5	2	16	2	19	3	19	10	74
Above ground,	6	20	. . .	. . .	2	4	4	8	2	5	3	11	17	48
Whole numbers,	67	187	54	169	69	89	62	102	44	120	40	174	282	682
Whole number of widows,		38		. . . . .		38		36		21		29		162
Whole number of orphans,		119		. . . . .		112		118		79		134		562

TABLE No. 4.—*Coal production, and number of persons employed, &c., &c., &c.*

	1872.	1874.	1875.	1876.	1877.	Averages and totals.
Production of coal per year in tons,	6,560,450	6,357,879	7,956,452	4,862,512	4,808,208	30,445,501
Number of persons employed,	15,261	16,561	17,808	17,152	16,312	16,619
Ratio of coal per person employed,	423.3	383.9	446.8	283.46	294.76	367.6
Ratio of coal per life lost,	97,917	92,143	128,340	110,511	120,205	109,823
Ratio of coal per person killed and injured,	25,828	40,202	48,515	39,458	22,463	35,292
Ratio of persons employed per life lost,	227.77	240.00	287.22	389.81	407.8	310.52

TABLE NO. 5.—*This table gives the total number of tons of coal mined, number of ratio of coal mined, in tons, per person employed, per person killed, and per 76-77, per person killed and per person injured.*

Delaware, Lackawanna and Western

NAME OF COLLIERY.	Total tons of coal mined.	Number of kegs of powder used.	Number of days worked.	NUMBER OF PERSONS EMPLOYED INSIDE.						
				Bosses.	Miners.	Laborers.	All company men.	Drivers and runners	Door boys.	Totals.
Pyne shaft,	99,189. 9	2,254	131	1	61	46	12	23	10	153
Taylor shaft,	70,072.13	2,649	130½	1	67	67	24	36	8	203
Archbald shaft,	. . .	. . .	. . .	. .	. .	. .	1	. .	. .	1
Scranton Coal Company slope,	213. 1	. . .	. . .	. .	. .	. .	1	. .	. .	1
Dodge shaft,	596. 4	. . .	. . .	1	. .	. .	2	. .	. .	3
Bellevue slope,	71,710.16	1,890	131½	1	57	43	12	15	4	132
Bellevue shaft,	38,495	1,013	131½	1	39	25	23	6	2	96
Sloan shaft,	91,452.13	2,406	140	1	68	48	16	20	8	161
Continental shaft,	88,971.16	2,224	140¾	1	70	52	14	36	12	185
Hampton shaft,	71,237.10	1,979	103	1	68	46	26	36	10	187
Central shaft,	94,121	2,091	140½	1	68	65	14	24	12	184
Hyde Park shaft,	. . .	. . .	. . .	. .	. .	. .	. .	. .	. .	. .
Oxford shaft,	. . .	. . .	. . .	. .	. .	2	. .	. .	. .	2
No. 2 Diamond shaft,	60,515.10	1,513	142¼	1	54	30	11	18	4	118
No. 2 shaft, (Diamond vein,)	51,686.10	1,292	142½	1	38	20	11	17	9	96
No. 2 slope, (Diamond mines,)	50,625.10	1,178	143½	1	44	25	16	13	7	106
Tripp slope,	46,325	1,544	143½	1	30	26	9	10	4	80
Brisbin shaft,	78,313. 3	2,526	127¾	1	64	42	14	16	6	143
Cayuga shaft,	78,839.11	2,253	126	1	51	45	17	16	5	135
Total, D. L. and W. R. R. Co.,	1,012,365. 6	26,812	. . .	15	779	582	223	286	101	1,986

Pennsylvania

No. 1 shaft,	2,363	82	208	1	8	8	. . .	. . .	. . .	9
No. 4 shaft,	77,432	2,978	208	1	52	52	7	20	1	133
No. 5 shaft,	59,816	2,300	213	1	42	42	8	15	3	111
No. 6 shaft,	51,418	2,337	213	1	39	40	19	18	4	121
No. 7 shaft,	75,856	2,918	210	1	46	46	14	19	5	131
No. 8 shaft,	70,909	2,727	208	1	53	53	10	12	3	132
No. 9 shaft,	43,023	1,655	199	1	36	34	9	12	5	97
No. 10 shaft—7 ft. vein,	45,280	1,741	200	1	39	40	10	15	3	108
No. 10 shaft—14 ft. vein,	65,571	2,522	199	1	53	54	12	21	5	146
No. 10 New shaft,	. . .	. . .	. . .	1	6	6	. . .	. . .	. . .	13
No. 11 shaft,	35,370	1,360	213	. .	26	28	6	9	2	71
No. 12 shaft,	53,019	2,039	200	1	38	38	6	10	4	97
No. 13 shaft,	2,377	92	. . .	. .	9	9	4	2	. . .	24
No. 2 slope, (P. G.)	38,627	1,447	202	1	28	28	11	10	1	79
No. 4 slope,	62,975	2,422	208	1	44	46	9	17	5	122
No. 6 slope,	23,867	914	208	1	20	20	5	3	2	51
Dawson shaft,	57,813	2,224	201	1	44	44	12	14	3	118
Stark's shaft,	76,978	3,666	205	1	56	56	11	15	8	147
Law's shaft,	40,154	1,544	200	1	35	36	8	8	6	94
No. 1 tunnel,	25,718	860	204	1	20	20	3	4	1	49
No. 2 slope, Dunmore,	42,220	1,624	194	1	28	31	9	9	9	87
Gipsey Grove—No. 3 shaft,	81,298	4,516	195½	1	32	36	12	12	5	98
Gipsey Grove—No. 4 shaft,			141¼	. .	36	37	10	12	5	100
Totals, Pennsylvania Coal Co.,	1,032,084	41,968	. . .	20	790	804	195	257	80	2,146

Delaware and Hudson

Von Storch slope and shaft,	159,268.19	4,550	160½	1	117	117	52	76	22	385
Leggett's Creek shaft,	91,380.10	2,611	152	1	85	85	39	63	17	290
Marvine shaft,	13,789.04	394	35½	1	45	45	12	11	6	120
Eddy Creek shaft,	38,224.06	1,529	82½	1	80	65	28	29	11	214
Grassy Island shaft,	86,703.18	3,468	140½	1	90	75	23	40	13	242
White Oak tunnel,	83,086.05	2,769	146¼	1	94	70	16	32	13	226
No. 1 shaft and W. B. tunnel,	19,748.15	658	159¾	1	94	75	13	34	3	220

kegs of powder used, number of days worked, number of men and boys employed, person injured during the year 1877. Also, the ratio of coal mined for 1874-75-

Railroad Company.

NUMBER OF PERSONS EMPLOYED OUTSIDE.							Ratio of coal mined during 1877 per person employed.	Ratio of coal mined during 1877 per person killed.	Ratio of coal mined during 1877 per person injured.	Ratio of coal mined during 1874-5-6-7 per person killed.	Ratio of coal mined during 1874-5-6-7 per person injured.
Bosses.	Mechanics.	Head and plate men.	All company men.	Drivers and runners.	Slate pickers.	Totals.					
1	6	9	30	5	84	135	344. 8	No death.	99,189.50	122,976.33	30,744.35
1	11	10	45	7	80	154	252. 6	90,072.13	45,034.25	119,047.00	34,013.43
. .	. . .	. . .	8	. . .	. . . .	8	. . . .	. . . . .	. . . . .	No death.	19,279.00
1	1	. . .	4	. . .	. . . .	6	. . . .	. . . . .	. . . . .	100,607.50	33,552.50
1	1	. . .	8	. . .	. . . .	10	. . . .	. . . . .	. . . . .	88,328.50	25,236.71
. .	. . .	. . .	. . .	. . .	. . . .	. . .	543. 6	No death.	35,855.36	No death.	47,659.33
1	12	13	36	9	96	167	146.37	19,247.50	4,277.22	19,247.50	4,266.11
1	7	12	24	5	68	117	328.00	No death.	45,726.28	459,575.00	32,826.78
1	9	9	27	3	71	120	291.87	No death.	29,657.25	224,701.50	28,087.69
1	9	13	27	6	61	117	234.33	71,237.50	11,872.91	109,165.50	36,388.50
1	7	8	22	3	55	96	336.15	No death.	No accident.	86,527.17	43,264.41
. .	. . .	. . .	2	. . .	. . . .	2	. . . .	. . . . .	. . . . .	148,513.00	148,513.00
. .	. .	9	. . .	. . .	. . . .	9	. . . .	. . . . .	. . . . .	10,199.66	2,399.88
1	10	14	32	18	92	167	212.30	No death.	12,103.10	96,417.00	28,925.10
. .	. . .	. . .	. . .	. . .	. . . .	. . .	538.40	25,843.25	25,843.25		
1	5	9	20	8	80	123	221.07	No death.	No accident.	151,369.00	60,549.60
. .	. . .	. . .	9	. . .	. . . .	9	520.50	No death.	No accident.	217,776.00	36,296.00
1	7	10	18	4	80	120	297.77	No death.	26,113.05	No death.	25,905.00
1	7	9	23	4	61	105	328.50	26,279.85	19,709.87	43,605.70	29,215.12
13	92	135	335	62	828	1,465	293.35	112,485.	33,745. 5	107,603.78	33,211.04

Coal Company.

. .	1	1	. . . .	. . .	. . . .	2					
1	4	8	4	1	. . . .	18	512.79	No death.	No accident.	96,548.25	64,365.50
. .	3	3	12	3	25	46	381.00	No death.	No accident.	104,337.66	52,169.00
1	3	4	10	2	25	45	309.75	No death.	10,283.60	No death.	33,118.00
1	3	9	7	. . .	4	24	489.39	75,856	37,928	71,816.40	44,885.25
1	3	12	9	2	37	64	358.50	No death.	35,454.50	95,225.00	57,135.00
. .	3	6	11	4	20	44	305.13	No death.	6,146.14	106,330.00	22,785.00
. .	2	6	9	. . .	24	41	303.89	45,280			
1	3	7	10	2	32	55	326.22	No death.	11,085.10	68,469.00	18,673.36
. .	2	3	. . . .	. . .	. . . .	5	. . . .	. . . . .			
. .	2	2	9	2	18	33	340.09	No death.	35,370	185,114.00	92,857.00
1	2	8	7	2	25	45	373.37	53,019	26,509.50	69,842.00	52,381.50
. .	2	3	3	3	6	17	57.97	. . . . .	2,377	No death.	2,377.00
. .	4	. . .	9	. . .	1	14	415.34	No death.	38,627	63,008.66	21,002.61
1	3	4	7	6	1	22	437.32	62,975	20,991.66	325,208.00	81,302.00
. .	1	1	. . . .	1	. . . .	3	442.00	11,933.50	3,409.71	59,503.66	19,834.45
1	4	6	8	3	30	52	340.08	57,813	19,271.00	288,291.00	57,658.20
1	5	7	14	4	37	68	358.00	76,978	76,978	65,958,33	39,575.00
. .	4	6	8	3	20	41	297.43	40,154	40,990.00	40,990.00	40,990.00
. .	3	. . .	12	1	. . . .	16	395.66	25,718	25,718	75,248.00	75,248.00
1	1	7	12	3	. . . .	24	380.36	No death.	42,220	No death.	55,143.25
2	1	4	10	3	43	63	311.45	No death.	20,324.50	67,413.00	36,299.30
. .	. . .	. . .	. . .	. . .	. . . .	. . .	. . . .	. . . . .			
12	59	107	171	45	348	742	357.37	93,825.82	24,573.43	94,597.66	37,415.49

Canal Company.

1	6	13	31	4	86	141	302.79	159,268	17,696.44	70,637.11	19,264.66
1	5	2	25	4	60	97	236.13	No death.	13,054.36	121,043.75	22,004.32
1	4	4	16	1	43	69	73.00	No death.	No accident.	No death.	27,789.00
1	13	7	24	5	60	110	117.97	No death.	19,112	172,238.00	43,059.50
1	12	9	24	6	63	115	242.89	No death.	86,703.18	No death.	47,136.42
1	6	4	15	8	67	101	254.00	No death.	No accident.	108,864.00	43,545.60
1	6	8	12	3	7	37	76.84	No death.	4,937.18	No death.	32,917.25

TABLE No. 5.—Delaware and Hudson

NAME OF COLLIERY.	Total tons of coal mined.	Number of kegs of powder used.	Number of days worked.	NUMBER OF PERSONS EMPLOYED INSIDE. Bosses.	Miners.	Laborers.	All company men.	Drivers and runners.	Door boys.	Totals.
No. 3 shaft,	15,074.09	504	156½	1	90	40	17	32	11	191
Coal Brook—5 tunnels,	130,825.04	4,366	134¾	1	175	100	32	64	24	396
Racket Brook breaker,	128,266.16	4,276	174¾	. .	. . .	. . .	. . .	. . .	. . .	. . .
Totals, D. & H. C. Co.,	766,428.06	25,125	. . .	9	870	672	232	381	120	2,284

Miscellaneous Com

Everhart colliery,	45,346.	1,345	198	1	31	37	2	13	2	86
Tompkins' shaft,	5,274.	388	52	1	32	19	6	9	3	70
Seneca slope,	64,508.	2,387	212	3	52	50	24	40	15	181
Ravine shaft,	14,358.	652	46	1	37	37	26	46	13	86
Twin shaft,	40,656.	1,381	197	2	27	27	8	12	5	81
Rock Hill tunnel,	18,003.	675	132½	1	16	16	2	5	. . .	40
Beaver colliery,	10,321.	256	147	1	5	5	. .	3	1	15
Butler shaft,	73,433.	2,728	224	1	40	50	7	17	2	117
Phœnix shaft,	42,858.09	1,414	205	2	30	18	6	9	4	69
Columbia colliery,	11,783.11	362	93	1	11	11	1	3	1	28
Hillside colliery,	71,413.	2,713	167	1	50	40	18	30	14	153
Greenwood colliery,	82,775.	3,864	132	1	80	80	20	38	13	232
Sibley shaft,	35,807.	1,816	107½	1	45	45	8	17	5	121
Meadow Brook shaft,	78,620.	2,590	140	1	68	63	8	30	10	180
National colliery,	75,882.	2,350	140	2	65	66	10	33	8	184
Park Coal Co. slope,	50,030.	2,074	160	1	34	34	12	12	7	100
Mt. Pleasant slope,	89,836.	2,190	162	1	60	60	17	29	17	178
Capouse shaft,	116,712.	3,887	152½	1	78	82	30	32	16	239
Pine Brook shaft,	88,855.	2,600	137	1	43	39	14	22	8	127
Fair Lawn slope,	22,620.	921	93¾	1	22	26	3	9	4	64
Jermyn's Green Ridge shaft,	68,786.	2,223	145	1	57	84	33	23	17	215
Green Ridge slope,	99,028.16	3,402	141¾	1	70	85	12	35	15	218
Roaring Brook colliery,	100,287.	5,047	154	2	66	66	27	45	14	220
Elk Hill colliery,	46,965.	1,750	153½	1	45	40	8	23	4	121
Filer colliery, Winton colliery,	139,049.	4,271	. . .	1	106	112	15	33	11	278
Eaton colliery,	63,568.	2,191	136	2	76	36	9	28	3	154
Jermyn's slope,	55,298.	1,653	140	1	46	50	8	20	7	132
Jermyn's No. 1 shaft,	69,858.	1,950	144	1	50	60	13	24	8	156
Erie shaft,	84,773.	2,657	144¾	1	98	88	9	34	13	243
Chestnut Hill colliery,	1,665.	69	34	1	10	7	2	2	1	23
Totals, miscellaneous,	1,768,368.14	61,806	. . .	37	1,450	1,413	320	706	241	4,167

Recapitulation.

Del., Lack. and Western R. R. Co.,	1,012,365.06	26,812	. . .	15	779	582	223	286	101	1,986
Pennsylvania Coal Company,	1,032,084.	41,938	. . .	20	790	804	195	257	80	2,146
Delaware and Hudson Canal Co.,	766,428.06	25,125	. . .	9	870	672	232	381	120	2,284
Miscellaneous companies,	1,768,368.14	61,806	. . .	37	1,450	1,413	320	706	241	4,167
Local sales, estimated,	228,962.	9,158	. . .	. .	. . .	. . .	. . .	. . .	. . .	200
Grand totals,	4,808,208.	164,869	. . .	81	3,889	3,471	970	1,630	542	10,783

Canal Company—Continued.

NUMBER OF PERSONS EMPLOYED OUTSIDE.							Ratio of coal mined during 1877 per person employed.	Ratio of coal mined during 1877 per person killed.	Ratio of coal mined during 1877 per person injured.	Ratio of coal mined during 1874-5-6-7 per person killed.	Ratio of coal mined during 1874-5 6-7 per person injured.
Bosses.	Mechanics.	Head and plate men.	All company men.	Drivers and runners.	Slate pickers.	Totals.					
1	6	7	7	. . .	8	29	68.52	No death.	5,024.83	No death.	9,356.60
1	10	4	30	14		141	243.75	65,442.50	32,721.25	177,848.25	71,139 30
1	1	5	14	7	62	90	1,425.17				
10	69	63	198	52	538	930	238.46	255,476.	38,386.22	136,841.30	31,473.50

panies and Operators.

1	5	7	2	7	30	52	407.07	45,346.	45,346.	62,412.66	62,412.66
1	5	6	4	2	28	46	45.46	. . . . .	5,274.	15,691.50	7,845.75
1	3	10	12	10	59	95	233.32	64,508.	21,502.66	57,438.50	25,528.22
1	2	6	20	5	58	92	80.59	. . . . .	. . . . .	. . . . .	31,217.
1	2	5	15	4	42	69	271.	20,323.	8,131.20	45,680.	20,302.33
1	1	4	8	1	10	25	277.				
1	2	5	5	. . .	20	33	215.				
2	7	10	12	5	80	118	312.48	. . . . .	36,716.50	146,716.50	36,679.13
1	5	6	7	2	34	55	345.63	. . . . .	7,143.	57,482.50	6,762.65
1	3	1	3	1	8	17	261.84	. . . . .	. . . . .	53,026.	53,026.
1	5	7	17	9	29	68	323.13	. . . . .	71,413.	273,910.	54,782.
1	9	8	18	11	60	107	244.17	82,775	10,347.	74,598.	26,328.70
1	4	5	27	3	63	103	159.85	. . . . .	35,807.	67,332.50	26,933.
2	10	6	10	5	70	103	277.80	. . . . .	13,103.33	203,312.	27,108.27
1	4	4	12	4	65	90	277.	75,882.	18,970.	66,209.50	20,372.16
1	4	6	19	2	56	88	266.11	. . . . .	50,030.	60,734.50	40,489.66
1	4	7	19	4	75	110	310.	. . . . .	92,459.	46,402.	24,747.73
. .	9	9	21	3	84	126	319.76	. . . . .	38,904.	. . . . .	73,467.40
1	6	4	8	1	15	35	548.49	44,417.50	9,861.33	43,036.71	15,062.85
2	5	4	5	5	24	45	207.52	11,310.	7,540.	43,832.66	16,437.25
1	5	8	26	3	60	103	216.30	68,786.	6,878.60	93,108.00	9,308.80
1	2	4	20	2	77	106	305.64	. . . . .	33,009.33	256,837.50	46,697.73
1	10	8	32	12	51	114	300.26	100,287.	20,057.40	118,766.50	39,588.83
1	5	6	14	2	42	70	245.89	46,965.	46,965.	87,121.	43,560.
1	5	8	27	6	70	117	352.	46,349.66	17,381.13	99,854.33	24,963.58
1	2	3	13	3	53	75	277.59	. . . . .	63,568.	213,671.50	47,482.71
1	5	6	16	3	60	91	252.50	55,298.	18,432.66	103,359.50	68,906.33
1	8	4	21	2	50	86	288.67	. . . . .	. . . . .	111,617.	111,617.
1	4	9	27	. . .	44	85	258.45	84,773.	84,773.	152,623.	101,748.66
. .	1	2	4	1	12	20					
31	142	178	444	118	1,429	2,342	271.65	98,242.66	19,014.7	95,886.3	30,943.4

Recapitulation.

13	92	135	335	62	828	1,465	293.35	112,485.	33,745.50	107,603.78	33,211.04
12	59	107	171	45	348	742	357.37	93,825.8	24,573.43	94,597.66	37,415.49
10	69	63	198	52	538	930	238.46	255,476.	28,386.22	136,841.30	31,473.50
31	142	178	444	118	1,429	2,342	271.65	98,242.6	19,014.7	95,886.3	30,943.4
. .	. . .	. . .	. . .	. . .	. . .	50					
66	362	483	1,148	277	3,143	5,529	294.76	120,205.2	22,463.6	111,558.	34,264.36

TABLE No. 6.—*This table relates to boilers and machinery, giving size and horse district, during*

NAME OF COLLIERY.	Number of boilers.	HOISTING ENGINES. Number of.	Direct acting or geared.	Number of cylinders.	Diameter of cylinders—in inches.	Length of stroke—in inches.	Horse power.
Pyne shaft,	12	2 3	Direct, 1 to 4.5	2 1	26 7	48 18	300 8
Taylor shaft,	12	2	1 to 4	2	16	30	120
Archbald shaft,	10	2	. . . . .	. . .	. . . .	. . . .	80
Scranton Coal Company slope,	12	2	1 to 4	2	16 18	36 36	160
Dodge shaft,	9	2	1 to 4	2	14	30	80
Bellevue slope,	9	1 2 2	1 to 4 1 to 4 1 to 4	. . . 5 . . .	12 16 14	36 36 30	210
Bellevue shaft,	9	2	1 to 4	2	16	36	90
Sloan shaft,	12	2	1 to 3	2	16	36	120
Continental shaft,	9	2	1 to 3½	2	16	32	120
Central shaft,	12	2	1 to 2¼	2	16	36	120
Hampton shaft,	13	2 2	1 to 3.8 1 to 4.25	2 2	14 10	30 18	140
Hyde Park shaft,	6	2	. . . . .	. . .	. . . .	. . . .	120
Oxford shaft,	12	4	. . . . .	. . .	. . . .	. . . .	155
No. 2 Diamond shaft,	17	2 1	1 to 2.8 1 to 4	2 1	14 14	30 18	110
No. 2 shaft, (Diamond vein,)	. . .	2	1 to 2.8	2	14	30	80
No. 2 slope, (Diamond mines,)	10	1 1	1 to 1.7 1 to .	1 1	16 13	36 18	100
Tripp slope,	7	2	3.5	2	10	24	45
Brisbin shaft,	12	.		2	16	36	120
Cayuga shaft,	12	2		2	16	36	120
No. 1 shaft,	6	2	. . . . .	2	. . . .	. . . .	60
No. 4 shaft,	7	3	. . . . .	3	. . . .	. . . .	80
No. 5 shaft,	3	1	. . . . .	1	. . . .	. . . .	40
No. 6 shaft,	6	2	. . . . .	2	. . . .	. . . .	65
No. 7 shaft,	5	1	. . . . .	1	. . . .	. . . .	40
No. 8 shaft,	5	1	. . . . .	1	. . . .	. . . .	40
No. 10 shaft,	3	3	. . . . .	3	. . . .	. . . .	105
No. 10 New shaft,	. . .	1	. . . . .	1	. . . .	. . . .	65
No. 11 shaft,	3	1	. . . . .	1	. . . .	. . . .	40
No. 12 shaft,	6	1	. . . . .	1	. . . .	. . . .	40
No. 13 shaft,	5	1	. . . . .	1	. . . .	. . . .	40
No. 2 slope, (P. G.,)	6	1	. . . . .	1	. . . .	. . . .	40
No. 4 slope,	5	3	. . . . .	3	. . . .	. . . .	60
No. 6 slope,	. . .	1	. . . . .	1	. . . .	. . . .	25
Dawson's shaft,	3	2	. . . . .	2	. . . .	. . . .	55
Stark's shaft,	5	3	. . . . .	3	. . . .	. . . .	80
Law's shaft,	6	1	. . . . .	1	. . . .	. . . .	40
Von Storch slope,	23	5	. . . . .	5	2=16 2=12 1=15	3=36 . . . 2=30	251
Leggett's Creek shaft,	14	5	. . . . .	5	2=16 1=18 2=8	3=36 . . . 2=10	210
Marvine shaft,	9	3	. . . . .	3	1=18 2=16	36	200
Eddy Creek shaft,	15	5	. . . . .	5	4=14 1=12	30	282
Grassy Island shaft,	12	4	. . . . .	4	2=12 2=8	2=30 2=10	82
White Oak colliery,	6	. . .	. . . . .	. . .	. . . .	. . . .	. . .
No. 1 shaft,	2	. . .	. . . . .	. . .	. . . .	. . . .	. . .
No. 3 shaft,	6	2	. . . . .	2	14	30	72
Coal Brook colliery,	4	1	. . . . .	1	16	36	61.6
Racket Brook breaker,	5	. . .	. . . . .	. . .	. . . .	. . . .	. . .
Tompkins' shaft,	6	1	. . . . .	1	15	36	45

power of all the steam engines and pumps in use in and around the collieries in this the year 1877.

BREAKER ENGINES.		FAN ENGINES.		PUMPING ENGINES.		DIRECT ACTING PUMPING ENGINES OR STEAM PUMPS.									
Number of.	Horse power.	Number of.	Horse power.	Number of.	Horse power.	Number of pumps used.	Number of pump.	Diameter of steam cylinder—in inches.	Diameter of water cylinder—in inches.	Length of stroke—in inches.	Discharge per stroke—in gallons.	Discharge per minute—in gallons.	Total number of engines.	Total horse power of engines	Number of mules and horses.
1	60	1	40	1	250	1	6	12	7	10	1.66	83	6	658	27
1	40	2	100	1	110	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	6	370	45
1	60	1	60	1	150	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	5	350	4
1	100	1	40	1	60	2	. . .	30	10	36	12.24	362.2	5	360	. . .
								8	5	10	.85	42.5			
1	60	. . .	. . .	1	101	1	. . .	8	5	10	.85	42.5	4	240	5
1	60	1	40	1	21	2	. . .	8	5	8	.68	54	8	335	16
								13	7	18	6.00	360			
								8	5	9	.7	91			
. . .	. . .	. . .	. . .	1	90	3	. . .	14	7	8	1.3	133	3	180	31
								14	7	8	1.3	133			
1	60	1	40	1	25	1	. . .	24	14	10	6.66	199	5	245	32
1	40	1	50	3	200	2	7	44	12	30	14.5	205.5	7	410	35
								24	12	26	12.5	178			
1	60	1	40	2	360	1	. .	10	6	12	1.47	88	6	580	30
1	60	. . .	. . .	2	130	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	7	380	30
1	60	. . .	. . .	2	300	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	5	380	. . .
1	60	1	40	1	80	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	7	335	. . .
1	65	1	80	4	360	2	. . .	34	16	48	41	835	9	615	38
								24	14	11	7	439			
. . .	. . .	. . .	. . .	. . .	. . .	1	. . .	20	10	36	12	244	2	80	34
								34	16	48	41	835			
1	35	. . .	. . .	3	200	3	. . .	20	12	30	14	440	6	335	26
								12	10	9	3	137			
								18	10	14	4	170			
. . .	. . .	. . .	. . .	3	76	3	. . .	20	10	14	12	532	5	121	27
								24	12	36	17	560			
1	80	1	60	1	40	1	. . .	24	8	10	2.17	150	5	300	21
1	40	1	40	2	240	2	. . .	14	9.75	12	2.4	244	6	440	29
								8	5	12	1	100			
. . .	. . .	1	20	. . .	. . .	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	3	80	. . .
. . .	. . .	1	20	1	40	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	5	140	17
. . .	. . .	. . .	. . .	1	10	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	2	50	18
1	25	. . .	. . .	. . .	. . .	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	3	90	21
. . .	. . .	. . .	. . .	1	130	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	2	170	18
1	25	. . .	. . .	. . .	. . .	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	2	65	13
1	40	. . .	. . .	3	65	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	7	210	41
. . .	. . .	. . .	. . .	2	65	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	3	130	2
. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	1	40	12
1	40	. . .	. . .	1	30	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	3	110	10
1	40	1	20	1	40	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	4	140	7
. . .	. . .	. . .	. . .	4	170	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .		210	13
. . .	. . .	. . .	. . .	1	75	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	4	75	21
. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	1	25	4
1	40	. . .	. . .	. . .	. . .	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	3	95	14
1	25	. . .	. . .	. . .	. . .	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	4	105	23
1	40	1	20	3	160	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	6	260	11
1	61.6	1	72	2	138	2	. .	34	16	48	83	500	9	522.6	55
								24	12	12	12	300			
1	61.6	1	49	3	147	3	. .	1=18	2=12	8	94	470	10	467.6	38
								2=24	1=12	12	24	600			
1	61.6	1	49	1	120	1	. .	60	. . .	. . . .	234	. .	6	430.6	11
1	36	2	72	1	77	2	. . .	24	12	36	36	468	9	467	34
										12	12	300			
1	61.6	. . .	. . .	1	77	2	. . .	30	12	36	36	468	6	220 6	48
								16	10	12	6	154			
1	61.6	. . .	. . .	. . .	. . .	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	1	61.6	34
. . .	. . .	1	49	1	61.6	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	2	110.6	32
. . .	. . .	1	49	1	100	2	. . .	36	. . . .	. . . .	422	. . . .	4	221	24
1	77	. . .	. . .	. . .	. . .	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	2	138.6	69
1	77	. . .	. . .	. . .	. . .	. . .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	1	77	3
1	30	1	8	1	40	2	5	. . . .	7	. . . .	2	200	3	123	8
							7	12	12	12	7	300			

TABLE No. 6—

NAME OF COLLIERY.	Number of boilers.	HOISTING ENGINES.					
		Number of.	Direct acting, or geared.	Number of cylinders.	Diameter of cylinders—in inches.	Length of stroke—in inches.	Horse power.
Everhart colliery,	5	2	.....	2	14	36	30
Ravine shaft,	4	1	Direct,	1	16	36	60
Seneca slope,	8	1	Direct,	1	16	36	60
Twin shaft,	9	2	Direct,	2	16 / 14	36 / 30	100
Beaver colliery,	2	1	Direct,	1	24	18	20
Rock Hill tunnel,	2	...	.....	...	....	....	...
Butler shaft,	7	2	Geared,	2	10 / 14	30	65
Hillside colliery,	10	2	Geared,	2	16 / 12	38 / 18	75
Columbia colliery,	2	...	.....	...	....	....	...
Phœnix shaft,	6	1	Geared,	1	18	36	60
Sibley shaft,	8	2	Geared,	2	14	30	90
Greenwood colliery,	13	2	Geared,	2	14	24	90
National colliery,	4	1	Geared,	1	10	18	52
Meadow Brook shaft,	7	2	Geared,	2	14	24	100
Park Coal Company slope,	8	4	Geared,	4	16 / 10	24 / 10	140
Mount Pleasant slope,	11	2	Direct,	2	26	48	100
Capouse shaft,	12	4	Geared,	4	14	30	160
Pine Brook shaft,	9	2	Geared,	2	12	30	120
Fair Lawn slope,	...	2	Geared,	2	9	10	40
Jermyn's Green Ridge shaft,	12	6	Geared,	6	8 / 14 / 16	10 / 30 / 36	220
Green Ridge slope,	9	3	Geared,	3	41	....	130
Roaring Brook shaft,	13	2	Geared,	2	14	....	80
Filer colliery,	12	4	Geared,	4	64	....	120
Eaton colliery,	6	5	Geared,	5	13	30	125
Jermyn's shaft,	14	2	Geared,	2	16	36	120
Jermyn's slope,	...	2	Geared,	2	12	30	50
Erie shaft,	9	2	Geared,	2	12	30	60
Elk Hill colliery,	...	1	Geared,	1	9	10	30
Totals,	583	161	.....	...	....	....	6,814

Continued.

BREAKER ENGINES.		FAN ENGINES.		PUMPING ENGINES.		DIRECT-ACTING PUMPING ENGINES OR STEAM PUMPS.							Total number of engines.	Total horse power of engines.	Number of mules and horses.
Number of.	Horse power.	Number of.	Horse power.	Number of.	Horse power.	Number of pumps used.	Number of pump.	Diameter of steam cylinder—in inches.	Diameter of water cylinder—in inches.	Length of stroke—in inches.	Discharge per stroke—in gallons.	Discharge per minute—in gallons.			
1	30	. . .	. . .	. . .	. . .	3	1	5	2¼	6	1.6	10	3	60	17
							4	10	6	13	3.2	110			
							8								
1	40	1	25	1	60	. . .	. . .	. . .	. . .	. . .	. . .	. . .	4	185	26
1	30	. . .	. . .	1	60	. . .	. . .	. . .	. . .	. . .	. . .	. . .	3	150	33
1	40	1	20	1	20	2	. . .	16	9	18	5	332	4	180	24
								8	5	12	. . .	102			
. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	20	11
1	25	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	25	10
1	40	. . .	. . .	2	40	2	3	5	6	7	.25	36	5	145	24
							10	14	8	12	2.61	130			
2	85	1	15	1	110	2	. . .	14	7	12	1.99	29.85	6	285	31
								16	8	18	3.91	215.05			
1	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	50	5
1	40	2	22	1	78	1	12	20	14	36	. . .	. . .	5	200	13
								14	8	18	3.9	250			
1	45	2	40	4	55	4	. . .	14	8	12	2.6	180	9	240	20
								10	6	12	1.45	140			
								8	5	12	1.00	100			
								22	10	24	8	400			
2	120	. . .	. . .	3	50	3	. . .	8	5	12	1	60	7	260	35
								8	4	12	0.6	40			
1	40	. . .	. . .	1	25	1	5	7.25	4.5	10	.69	69	3	117	29
1	45	. . .	. . .	1	45	1	12	20	10	24	16	1,600	4	190	26
1	35	2	30	2	60	2	4	5.5	3.75	7	1	100	9	265	24
							6	7.5	5	10	1.75	175			
							10	16	10	16	5.03	200			
1	40	1	20	4	100	4	6	7.5	5	4.5	.85	50	8	260	29
							5	7	4.5	5	.69	40			
1	40	2	70	1	60	2	8	18	16	10	104.5	1.045	8	330	48
								16	8	7	1.66	16.5			
1	40	. . .	. . .	1	60	5	. . .	18	12	108	54	480	4	180	29
1	35	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	3	75	13
								14	8	10	16	88			
1	60	2	105	. . .	. . .	5	. . .	18	12	10	4	195	9	385	18
								24	14	12	9	320			
							21	21	12	20	9.7	293			
1	60	1	25	. . .	. . .	3	7	8	5	9	.76	34.9	7	215	38
							4	6	4	5.5	.29	14			
1	40	. . .	. . .	1	90	. . .	. . .	. . .	. . .	. . .	. . .	. . .	4	210	53
1	30	. . .	. . .	. . .	. . .	6	. . .	50	32	48	. . .	. . .	5	150	35
1	25	. . .	. . .	. . .	. . .	2	6	7	5	9	3	90	6	150	35
1	30	. . .	. . .	. . .	. . .	3	. . .	18	12	10	. . .	. . .	3	150	26
1	25	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	3	75	23
1	25	. . .	. . .	1	60	1	5	7	4½	10	69	58.6	4	145	30
. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	30	28
61	2,858	40	1,390	82	5,362	91	. .	. . .	. . .	. . .	. . .	. . .	368	17,026	1,764

Table No. 7.—*This table gives dimensions of shafts, slopes, drifts, and tunnels, with number of breakers.*

Delaware, Lackawanna and Western Railroad Company.

Name of Colliery.	Shafts.					Surface Slopes.				Underground Slopes.				Total depth of mines in feet.	Elevation.		Total Open'gs.			Number of coal breakers.
	Number of.	Length in feet.	Width in feet.	Depth in feet.	Elevation of head ab. tide-water, in feet.	Number of.	Length in feet.	Vertical depth in feet.	Elevation of head ab. tide-water, in feet.	Number of.	Length in feet.	Vertical depth in feet.	Elevation of head ab. tide-water, in feet.		Of bottom above tide-water, in feet.	Of bottom below tide-water, in feet.	Shafts.	Slopes.	Drifts and tunnels.	
Pyne shaft,	1	35	10	307	853	1	800	283	837	1	280	15	547	325	527	....	1	1	....	1
Taylor shaft,	1	18	10	180	696	1	130	76	667	..	.....	.....	.....	200	496	....	1	1	1	1
Seranton Coal Company,*	...	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	2	1
Bellevue slope,	...	.....	.....	.....	.....	1	671	133	753	1	557	65	625	193	560	....	....	1	1	1
Bellevue shaft,	1	18	10	226	714	...	.....	.....	.....	.....	.....	.....	.....	232	481	....	1	...	1	1
Archbald shaft,*	...	.....	.....	.....	.....	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sloan shaft,	1	35	10	393	854	1	800	310	775	...	.....	.....	.....	403	451	....	1	1	....	1
Continental shaft,	1	21	10	323	847	...	.....	.....	.....	.....	.....	.....	.....	333	514	....	1	..	....	1
Hampton shaft,	1	18	9	125	777	...	.....	.....	.....	2	500	20	650	180	597	....	1	.....	.....	1
											600	18	634							
Central shaft,	1	34	10	320	813	...	.....	.....	.....	1	900	31	496	348	465	....	1	.....	.....	1
Hyde Park shaft,*	1	.....	.....	.....	.....	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1
Oxford shaft,*	2	.....	.....	.....	.....	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	...	1	1
No. 2 Diamond shaft,	1	20	10	223	776	...	.....	.....	.....	1	148	28	553	251	525	....	1	1	....	1
No. 2 shaft, Diamond vein,	1	14	10	167	776	...	.....	.....	.....	.....	.....	.....	.....	167	609	....	1	..	....	
No. 2 Diamond slope,	...	.....	.....	.....	.....	1	375	146	709	1	480	25	577	171	537	....	...	1	....	1
Tripp's slope,	...	.....	.....	.....	.....	1	310	50	714	.....	.....	.....	.....	71	642	.....	...	1	....	
Brisbin shaft,	1	37	10	378	952	...	.....	.....	.....	.....	.....	.....	.....	396	556	....	1	...	....	1
Cayuga shaft,	1	34	10	368	900	...	.....	.....	.....	.....	.....	.....	.....	388	512	....	1	...	....	1
Totals,	14	..	..	...	.....	7	.....	.....	.....	7	.....	.....	.....	...	.....	.....	14	7	6	14

Pennsylvania Coal Company.

No. 1 shaft,	1	20	10	430	731	...	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	1	.....	.....	.....
No. 4 shaft,	1	16½	9½	191	636	...	.....	.....	.....	1	700	.....	.....	...	.....	.....	1	.....	.....	1
No. 5 shaft,	1	16	9½	255	736	...	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	1	.....	.....	.....
No. 6 shaft,	1	16	9½	312	....	...	.....	.....	.....	1	825	130	.....	...	.....	.....	1	.....	.....	1
No. 7 shaft,	1	16	9½	312	629	...	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	1	.....	.....	.....

No. 8 shaft,	1	14	10	206	748										206	542		1			1
No. 9 shaft,	2	19 16	10 12	140 132	586					1	630	67					2				
No 10 shaft, (7 ft. vein,)	1	12	11	100	612					1	290	30	512	130	482		1				1
No. 10 shaft, (14 ft. vein,)	1	27 3/3	12	159	612					1	375	22	512	181	431		1				
No. 11 shaft,	1	16	9 1/2	191	833									191	642		1				
No. 12 shaft,	1	18 1/2	10	135	840									135	805		1				1
No. 13 shaft,	1	31 1/2	12	137	816									137	679		1				1
No. 2 slope, (P. G.,)						1													1		1
No. 4 slope,	1	12	10	77	838	1	184			1	674						1	1		1	1
No. 6 slope,	1	13 1/2	10	99	773									99	674						
Dawson's shaft,	1	16 1/2	12	165	865					1	596	29		192	673		1			1	1
Stark's shaft,	1	16 1/2	12	113	860					2	1,150 500	46 26		184	676		1			1	1
Law's shaft,	1	24 1/2	12	207	840									207	633		1				1
No. 1 tunnel,						1	660	167	760					167	493			1			1
No. 2 slope, (Dunmore,)	1			100		1	1,800	102						102			1	1			
No. 3 shaft, (Gipsey Grove,)	1	18	12	167										167			1				1
No. 4 shaft, (Gipsey Grove,)	1	17	12	105										105			1				
Totals,	21					4				9							21	4	3	13	

Delaware and Hudson Canal Company.

Von Storch slope,	2	30 10	10 10	540 250	1,177	1	225			1	350			540	560		2	1			1
Leggett's Creek shaft,	2	24 12	10 10	340 340	789					1	300	15	449	355	434		2				1
Marvine shaft,	1	44	10	330	742									330	412		1				1
Eddy Creek shaft,	2	27 23	10 10	408 386	782 785					1	450			408	377		2				1
No. 1 and No. 2 colliery, Olyphant,*																				2	1
Grassy Island shaft,	2	14 24	10 10	170 275	879 908					2	500 300	16	633	291	617		2				1
White Oak colliery,	2	91D 7	7	90 30	1,022					1	1,050			90	1,022		2			1	1
Powderly colliery.* No. 1 shaft and W. B. tunnel,	1	11	11	89	998	1	450	65	998					89	909		1	1	1		1
No. 3 shaft,	2	24 10	9 10	70 30	1,022 1,073									70	952		2				1
Coal Brook colliery,	3	8 10 8	8 7 8	25 50 40	1,200					2	275 400			50	1,150		3			5	1
Totals,	17					2				8							17	2	9	10	

TABLE No. 7—Continued.

Miscellaneous Companies and Operators.

NAME OF COLLIERY.	SHAFTS.					SURFACE SLOPES.				UNDERGROUND SLOPES.				Total depth of mines in feet.	ELEVATION.		TOTAL OPEN'GS.			Number of coal breakers.
	Number of.	Length in feet.	Width in feet.	Depth in feet.	Elevation of head ab. tide-water, in feet.	Number of.	Length in feet.	Vertical depth in feet.	Elevation of head ab. tide-water, in feet.	Number of.	Length in feet.	Vertical depth in feet.	Elevation of head ab. tide-water, in feet.		Of bottom above tide-water, in feet.	Of bottom below tide-water, in feet.	Shafts.	Slopes.	Drifts and tunnels.	
Everhart colliery,	...	...	...	...	...	1	175	58	930	...	...	...	...	58	872	...	...	1	1	1
Tompkins shaft,	1	12	10	130	621	...	...	...	...	1	80	25	491	155	466	...	1	...	...	1
Seneca slope,	3	6 8 10	6 8 10	50 70 75	760	1	449	175	760	...	...	...	...	175	585	...	3	1	...	1
Ravine shaft,	1	10	6½	75	770	...	...	...	...	...	...	...	...	75	695	...	1	...	...	1
Twin shaft,	1	10	10	110	778	...	...	...	...	1	270	30	668	140	638	...	1	...	...	1
Rock Hill tunnel,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	668	...	...	...	1	1
Beaver colliery,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	660	...	...	...	1	1
Butler shaft,	1	16	10	98	738	...	...	...	...	1	375	30	612	128	610	...	1	...	1	1
Phœnix shaft,	1	20	12	180	598	...	...	...	...	...	...	...	...	180	418	...	1	...	...	1
Columbia colliery,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	627	...	...	...	1	1
Hillside colliery,	1	22	14	147	721	1	360	152	721	1	450	27	527	174	447	...	1	1	...	1
Greenwood colliery,	...	...	...	...	...	1	600	80	840	...	...	...	...	80	760	...	...	1	2	1
Sibley shaft,	1	30	10	190	760	1	100	40	749	...	...	...	...	194	566	...	1	1	...	1
Meadow Brook shaft,	1	21	12	155	830	1	200	66	800	...	...	...	...	155	775	...	1	1	...	1
National colliery,	1	8	8	112	800	1	250	83	800	...	...	...	...	112	688	...	1	1	4	1
Park Coal Company slope,	...	...	...	...	...	2	800 225	50 85	760	...	...	...	...	200	560	...	..	2	...	1
Mt. Pleasant slope,	1	13D	...	300	831	1	1,200	300	815	1	200	28	531	...	481	...	1	1	1	1
Caponse shaft,	2	25 30	10 10	300 167	852	...	...	...	...	...	...	...	...	300	552	...	2	...	1	1
Pine Brook shaft,	1	22	10	175	705	...	...	...	...	...	...	...	...	175	530	...	1	...	1	1
Fair Lawn slope,	...	...	...	...	...	1	340	145	852	...	...	...	...	145	807	...	...	1	...	1
Green Ridge shaft,	2	32 15	17 10	160 165	860	...	...	...	...	...	...	...	...	193	667	...	2	...	...	1
Green Ridge slope,	...	...	...	...	...	1	300	100	800	1	210	70	700	170	630	...	...	1	...	2
Roaring Brook colliery,	2	14 21	10 10	290	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	1
Elk Hill colliery,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1

Filer colliery,	1	22	10	110	917	1	320	106	929	..		...	...	110	807	....	1	1	1	1
Winton colliery,	...	...	...	...	....	1	....	...	....	..		...	....	...	....	....	..	1	...	1
Eaton colliery,	1	16	10	33	979	1	550	72	994	..		...	....	72	907	....	1	1	2	1
Jermyn's slope,	...	...	...	...	....	1	250	...	998	..		...	....	...	....	....	...	1	...	1
Jermyn's shaft,	1	20	10	90	987	...	.....	...	....	1	1,000	...	....	...	....	....	1	...	1	1
Erie shaft,	1	18	8	180	923	...	.....	...	....	...	.....	...	....	180	743	....	1	...	1	1
Chestnut Hill colliery,	...	...	...	...	....	...	.....	...	....	...	.....	...	....	...	...	....	...	...	1	1
Totals,	24	...	...	...	....	16	....	...	....	7	.....	...	....	...	...	...	24	16	23	32

*Idle all through the year.

TABLE No. 8.—*This table gives some interesting details relative to fan ventilation, speed of the fans, amount of air exhausted, and horse power applied to move the air, and conditions under which the tests were made.*

Delaware, Lackawanna and Western Railroad Company.

NAME OF COLLIERY.	Number of fans.	Kind of fan used.	SIZE OF FAN. Diameter.	SIZE OF FAN. Face.	Revolutions per minute of engine.	Revolutions per minute of fan.	Elevation above tide water.	Temperature outside of the mines, in deg. Fah.	Temperature inside of the mines, in deg. Fah.	Atmospheric pressure indicated by the barometer.	Water gauge.	Area of air-way where velocity of air was measured.	Velocity of air in the mines, indicated by the anemometer.	Air exhausted in cubic feet per revolution of fan.	Air in the mines in cubic feet per minute.	Horse power of the fan.
Pyne shaft,	1	All open periphery, and manufactured by themselves.	12′	4′	45	112½	864′	38	57	29.78	.5	100	1,030	963.	103,000	8.112
Taylor shaft,	2		14′	4′	45	110	746′	38	51	29.60	1.2	90	1,300	1,063.	117,000	22.126
Archbald shaft,	1		12′	3′ 6″	40	113	887′	41	52	29.97	.5	110	632	615.	69,520	5.47
Scranton Coal Co. slope,	1		12′	3′ 8″	39	117	712′	40	56	30.20	.7	104	850	755.	88,400	9.75
Bellevue slope,	1		14′	4′	45	90	744′	46	58	29.29	.3	48	....	1,663.	149,694	7.36
Bellevue shaft,								39	42	29.29	.3	159				
Sloan shaft,	1		12′	4′	40	100	869′	34	57	29.92	.6	120	600	876.	87,680	8.29
												49	320			
Continental shaft,	1		12′	3′ 8″	38	100	867′	35	50	29.98	.5	81	792	643.	64,152	5.05
Central shaft,	1		12′	3′ 8″	44	114	823′	47	57	30.02	.6	66	1,393	806.	91,938	8.69
No. 2 Diamond shaft,	2		12′	3′ 8″	45	90	921′	49	63	29.79	...	90	650	650.	58,500	14.08
No. 2 shaft, (Diamond vein,)			....	....	....	....	....	....	....	....	.6	75	700	583.	52,500	
Tripp slope,			12′	3′ 8″	45	90	923′	49	63	29.79	...	111	686	421.	37,911	
Brisbin shaft,	1		14′	4′	44	88	963′	42	58	29.02	.2	108	695	853.	75,060	2.365
Cayuga shaft,	1		12′	3′ 8″	38	106	914′	38	50	28.92	.4	72	800	543.	57,600	3.63

Delaware and Hudson Canal Company.

Von Storch slope,	1	Imitation of Guibal.	20′	5′	75	75	850′	65	61	29.67	.5	60	625	500.	37,500	2.95
Leggett's Creek shaft,	1	Imitation of Guibal.	20′	5′	75	75	789′	62	56	29.65	.55	188	400	1,002.	75,200	6.51
Marvine shaft,	1	Imitation of Guibal.	20′	5′	60	60	742′	66	60	29.45	.25	92	590	904.6	54,280	2.13
Eddy Creek shaft,	1	Imitation of Guibal.	20′	5′	50	50	785′	62	59	29.94	.3	70	920	1,288.	64,400	3.04
No. 1 shaft and W. B. tunnel,	1	Imitation of Guibal.	17′	4′	60	90	1,040′	60	57	29.09	.6	80	1,475	1,311.	118,000	11.15
No. 3 shaft,	1	Imitation of Guibal.	17′	4′	50	100	1,072′	70	66	28.88	1.15	68	1,040	707.	70,720	12.81

Miscellaneous Companies and Operators.

Tompkins' shaft,	1	Patterson,	6′ 6″	3′	130	195	571′	53	62	29.58	.3	34	660	115.+	22,440	1.06
Ravine shaft,	1	Guibal,	15′ 8″	4′	60	60	734′	49	60	29.35	...	65	120	302.	18,120	0.1234
Seneca slope,							740′	49	60	29.35	.4	70 16				
Butler shaft,	1	Patterson,	6′	3′	36	222	790′	42	44	30.00	.8	50	340	76.57	17,000	2.14
Phœnix shaft,	1	Dawson,	15′	5′	55	75										
Sibley shaft,	1	Guibal,	15′	4′	80	80	764′	44	48	29.14	.6	98	816	1,000.	80,000	7.56
Capouse shaft,	1	Guibal,	20′	4′	50	55	852′	40	56	29.50	.5	80	900	1,280.	64,000	5.04
Mt. Pleasant slope,	1	Dawson,	15′	4′	53	82	831′	46	58	29.68	.7	69 63	380 383	615.2	50,449	5.57
Green Ridge slope,	1	Dawson,	12′	3′	55	110	800′	46	59	29.66	.7	44 70	280 490	481.8	53,000	5.85
Jermyn's Green Ridge shaft,	1	Imitation of Guibal,	20′	5′	75	75	750′	38	57	29.50	1.2	76	840	851.2	63,840	12.07
Hillside colliery,	1	Imitation of Guibal,	15′	4′	75	65	684′	47	86	29.6	.35	65	480	480.	31,200	1.72

TABLE No. 9.—*This table is intended to show the power applied by furnaces on ventilation and the conditions under which such power is produced.*

NAME OF COLLIERY.	Depth of upcast shaft.	Area of upcast in square feet.	Mean temperature in upcast in deg. Fah.	Mean temperature in downcast in deg. Fah.	Atmospheric pressure indicated by barometer.	Elevation of shaft above tide water.	Surface area of grate in square feet.	Amount of air in the mines in cubic ft. per minute.	Horse power of furnace.
Taylor drift,	60	144	200	30	30.08	736	56	25,600	.98
Dodge shaft,	330	132	177	31	30.16	842	112	142,406	26.66
Hampton shaft,	143	48	200	20	30.20	792	48	44,600	4.40
Hyde Park shaft,	273	140	175	32	30.00	843	96	68,260	10.31
Oxford shaft,	180	60	180	28	30.10	767	56	23,400	2.48
No. 2 Diamond slope,	155	144	210	25	30.40	733	96	54,400	5.31
Pine Brook shaft,	200	113	140	40	29.50	705	. . . .	47,140	3.74
Elk Hill colliery,	60	56	125	35	30.00	830	42	24,000	.5443
Greenwood slope,	78	64	90	48	29.12	840	48	20,580	.2832
Greenwood No. 8 drift,	50	64	92	42	29.11	868	30	10,000	.1059
Greenwood No. 10 drift,	50	64	96	40	29.07	896	30	9,200	.1086
National slope,	136	36	100	54	29.60	738	36	25,000	.648
Meadow Brook shaft,	217	54	121	30	29.6	765	50	45,000	3.72
Meadow Brook tunnel,	60	36	98	38	29.6	876	64	35,000	.5409
Grassy Island shaft,	170	70	220	75	29.76	908	64	49,000	3.97
Filer colliery,	76	48	44	40	29.	929	60	41,805	.059
Erie colliery,	140	140	180	48	29.2	854	64	35,490	2.374

TABLE No. 10.—*Giving the names of Collieries, location of Collieries, and names of Operators, Agents, Mine Superintendents, and Bosses.*

NAME OF COLLIERY.	LOCATION OF COLLIERY.	NAME OF OPERATOR.	NAME OF GENERAL AGENT.	NAME OF GENERAL MINE SUPERINTENDENT.	NAME OF MINE BOSS.	NAME OF OUTSIDE FOREMAN.
Pyne shaft,	Lackawanna township,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	John L. Lewis,	A. Reinhard.
Taylor shaft,	Lackawanna township,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	Morgan Harris,	J. P. Cooper.
Archbald shaft,	Lackawanna township,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	. . . . .	. . . . .
Scranton Coal Company slope,	Lackawanna township,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	Lewis Roberts,	John A. Mears.
Dodge shaft,	Lackawanna township,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	Lewis Roberts,	Edward E. Thomas.
Bellevue shaft,	Lackawanna township,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	John Hale,	John M. Acker.
Bellevue slope,	Lackawanna township,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	G. M. Williams,	John M. Acker
Sloan shaft,	Lackawanna township,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	John T. Williams,	John Reese.
Continental shaft,	Lackawanna township,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	William Donse,	J. F. Green.
Hampton shaft,	Lackawanna township,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	Thomas Carson,	B. C. Green.
Central shaft,	Hyde Park,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	John Flynn,	S. N. Stetler.
Hyde Park shaft,	Hyde Park,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	. . . . .	R. Ruthven.
Oxford shaft,	Hyde Park,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	. . . . .	. . . . .
No. 2 Diamond shaft,	Hyde Park,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	Reese T. Evans,	D. Langstaff.
No. 2 shaft, (Diamond vein,)	Hyde Park,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	D. W. Mosier,	D. Langstaff.
Tripp's slope, (Diamond mines)	Hyde Park,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	John Von Bergen,	D. Langstaff.
No. 2 slope, (Diamond mines,)	Hyde Park,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	Daniel Phillips,	D. Langstaff.
Brisbin shaft,	Providence,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	Frank Zimmerman	D. E. Bell.
Cayuga shaft,	Providence,	Delaware, Lackawanna, and Western R. R. Co.,	W. R. Storrs,	Benjamin Hughes, T. D. Davis, Ass't,	Thomas Watkins,	J. C. Bowman.
No. 1 shaft,	Pittston township,	Pennsylvania Coal Co.,	John B. Smith,	Andrew Bryden,	Alex. Thompson,	Hugh Ferguson.
No. 4 shaft,	Pittston borough,	Pennsylvania Coal Co.,	John B. Smith,	Andrew Bryden,	Peter P. Daley,	James Delaney.
No. 5 shaft,	Jenkins township,	Pennsylvania Coal Co.,	John B. Smith,	William Law,	Benjamin Harding,	Peter Daley, jr.
No. 6 shaft,	Jenkins township,	Pennsylvania Coal Co.,	John B. Smith,	William Law,	William Reynolds,	T. L. McMillan.
No. 7 shaft,	Jenkins township,	Pennsylvania Coal Co.,	John B. Smith,	William Law,	William Reid,	John Portius.

TABLE No. 10—*Continued.*

NAME OF COLLIERY.	LOCATION OF COLLIERY.	NAME OF OPERATOR.	NAME OF GENERAL AGENT.	NAME OF GENERAL MINE SUPERINTENDENT.	NAME OF MINE BOSS.	NAME OF OUTSIDE FOREMAN.
No. 8 shaft,	Pittston township,	Pennsylvania Coal Co.,	John B. Smith,	Andrew Bryden,	Alex. Thompson,	Hugh Fergusen.
No. 9 shaft,	Pittston borough,	Pennsylvania Coal Co.,	John B. Smith,	Andrew Bryden,	Adam Harkness,	Cuthbert Snowden.
No. 10 shaft, (7 ft. vein,)	Pittston township,	Pennsylvania Coal Co.,	John B. Smith,	Andrew Bryden,	John M. Lewis,	Cuthbert Snowden.
No. 10 shaft, (14 ft. vein,)	Pittston township,	Pennsylvania Coal Co.,	John B. Smith,	Andrew Bryden,	William Abbott,	Cuthbert Snowden.
No. 10 new shaft,	Pittston township,	Pennsylvania Coal Co.,	John B. Smith,	Andrew Bryden,	John L. Cartright,	Cuthbert Snowden.
No. 11 shaft,	Jenkins township,	Pennsylvania Coal Co.,	John B. Smith,	Andrew Bryden,	Benj. Harding,	Peter Daley, jr.
No. 12 shaft,	Pleasant Valley borough,	Pennsylvania Coal Co.,	John B. Smith,	William Law,	John B. Law,	R. Thompson.
No. 13 shaft,	Lackawanna township,	Pennsylvania Coal Co.,	John B. Smith,	William Law,	John B. Law,	
No. 2 slope,	Jenkins township,	Pennsylvania Coal Co.,	John B. Smith,	William Law,	Henry Jopling,	John Glenn.
No. 4 slope,	Jenkins township,	Pennsylvania Coal Co.,	John B. Smith,	Andrew Bryden,	James Watson,	S. McDowall.
No. 6 slope,	Pittston township,	Pennsylvania Coal Co.,	John B. Smith,	Andrew Bryden,	Alex. Thompson,	Hugh Fergusen.
Dawson shaft,	Pleasant Valley borough,	Pennsylvania Coal Co.,	John B. Smith,	William Law,	Thomas Weir,	Wm. Anderson.
Stark shaft,	Pleasant Valley borough,	Pennsylvania Coal Co.,	John B. Smith,	William Law,	Alexander Laird,	Frank Bone.
Law shaft,	Pittston township,	Pennsylvania Coal Co.,	John B. Smith,	William Law,	Robert McMillan,	George M. Snyder.
No. 1 tunnel,	Pittston township,	Pennsylvania Coal Co.,	John B. Smith,	William Law,	Samuel Bennett,	Thomas Hastie.
No. 2 slope,	Dunmore borough,	Pennsylvania Coal Co.,	John B. Smith,	James Young,	John Moffatt,	J. W. Marshall.
Gipsey Grove colliery,	Dunmore borough,	Pennsylvania Coal Co.,	John B. Smith,	James Young,	P. H. O'Haro,	Wm. A. Jennings.
Von Storch slope,	Providence,	Del. and Hud. Canal Co.,	A. H. Vandling,	Andrew Nicol,	E. D. Jones,	Charles W. Zeigler.
Leggett's Creek shaft,	Providence,	Del. and Hud. Canal Co.,	A. H. Vandling,	Andrew Nicol,	Finlay Ross,	J. L. Atherton.
Marvine shaft,	Providence,	Del. and Hud. Canal Co.,	A. H. Vandling,	Andrew Nicol,	Joseph V. Birtley,	George Griffin.
Eddy Creek shaft,	Olyphant borough,	Del. and Hud. Canal Co.,	A. H. Vandling,	Andrew Nicol,	James Nicol,	William Bell.
Grassy Island shaft,	Olyphant borough,	Del. and Hud. Canal Co.,	A. H. Vandling,	Andrew Nicol,	Andrew Patten,	Joseph P. Bell.
White Oak colliery,	Archbald,	Del. and Hud. Canal Co.,	A. H. Vandling,	Andrew Nicol,	Hugh Jones,	Thomas Law.
No. 1 shaft and tunnel,	Carbondale City,	Del. and Hud. Canal Co.,	A. H. Vandling,	Andrew Nicol,	John Campbell,	Wm. G. Bowers.
No. 3 shaft,	Carbondale City,	Del. and Hud. Canal Co.,	A. H. Vandling,	Andrew Nicol,	John Hughes,	Thomas Coogan.
Coal Brook colliery,	Carbondale City,	Del. and Hud. Canal Co.,	A. H. Vandling,	Andrew Nicol,	William McMyne,	William Bowers.
Everhart colliery,	Jenkins township,	Hon. T. Waddell & Co.,	Hon. T. Waddell	Hon. T. Waddell,	Elihu Smith,	William Mitchell.
Tompkins' shaft,	Pittston borough,	Alva Tompkins,	Alva Tompkins,	D. Davis,	David W. Evans,	David W. Evans.
Seneca slope,	Pittston borough,	Pittston Coal Company,	Chas. Hiscock,	Charles Hiscock,	Thomas Smiles,	Adam Koon.
Ravine shaft,	Pittston borough,	Pittston Coal Company,	Chas. Hiscock,	Charles Hiscock,	Thomas Smiles,	John Miller.
Twin shaft,	Pittston borough,	Pittston Coal Company,	Chas. Hiscock,	Charles Hiscock,	Thomas Smiles,	John Fallon.
Rock Hill tunnel,	Pittston borough,	Bowkley & Son,	Bowkley & Son,	J. A. Bryden,	J. A. Bryden,	A. Price.
Beaver colliery,	Pittston borough,	Waterman & Beaver,	Dan'l Edwards,	Daniel Edwards,	Fred. Burkert,	J. J. Powell.
Butler shaft,	Pittston township,	Butler Colliery Company,	S. B. Bennett,	S. B. Bennett,	Thomas Fitley,	Robert Jaques.
Phœnix shaft,	Pittston township,	H. W. Bellman,	C. M. Sanderson,	H. W. Bellman,	Wm. Simmens,	J. J. Hoffer.
Columbia colliery,	Pittston township,	Grove Brothers,	Grove Bros.,	Daniel Evans,	Daniel Evans,	E. J. Evans.
Hillside colliery,	Pleasant Valley,	Hillside Coal & Iron Co.,	Samuel Hines,	W. E. Colborne,	Joseph Davies,	J. D. Caryl.
Greenwood colliery,	Lackawanna township,	Penn'a Anth. Coal Co.,	B. F. Filmore,	B. F. Filmore,	W. T. Courtright,	W. L. Coyne.
Sibley shaft,	Old Forge township,	Penn'a Anth. Coal Co.,	B. F. Filmore,	B. F. Filmore,	Fred. Repp,	William Repp.
Meadow Brook shaft,	Scranton City,	William Connell & Co.,	Wm. Connell,	Wm. Connell,	Samuel T. Jones,	Robert Penman.
National colliery,	Scranton City,	William Connell & Co.,	Wm. Connell,	Wm. Connell,	John Humphreys,	Robert Penman.
Park Coal Company slope,	Hyde Park,	School Fund Association,	A. B. Stevens,	Morgan Bowen,	Morgan Bowen,	David Brooks.
Mount Pleasant slope,	Hyde Park,	W. T. Smith,	W. T. Smith,	W. T. Smith,	James R. James,	Thomas Bevan.

Capouse shaft,	Hyde Park,	Lack. Iron and Coal Co.,	W. W. Scranton,	C. F. Mattes,	Rees G. Brooks,	
Pine Brook shaft,	Scranton City,	Lack. Iron and Coal Co.,	W. W. Scranton,	C. F. Mattes,	R. R. Griffiths,	Henry Hess.
Fair Lawn slope,	Scranton City,	Fair Lawn Coal Company,	J. J. Hosie,	John H. Hosie,	Daniel Bradley,	John H. Hosie.
Jermyn's Green Ridge shaft,	Scranton City,	John Jermyn,	John Jermyn,	John Jermyn,	Joseph D. Lloyd,	Joseph Jermyn.
Green Ridge slope,	Dunmore borough,	Green Ridge Coal Co.,	O. S. Johnson,	O. S. Johnson,	Elias Hughes,	W. S. Boyd.
Roaring Brook colliery,	Dunmore borough,	Roaring Brook Coal Co.,	John R. Davies,	John R. Davies,	Patrick Mongan,	J. McDermott.
Elk Hill colliery,	Dickson City borough,	Elk Hill Coal and Iron Co.,		Benjamin Reese,	Benjamin Rees,	Benjamin Rees.
Filer colliery, Winton colliery,	Winton borough,	Filer & Livey,	George Filer,	George Filer,	Rich. D. Roberts,	David E. Stearns.
Eaton colliery,	Archbald borough,	Jones, Simpson & Co.,	Jones, Simpson, & Co.,	James Eaton,	James Eaton,	George W. Eaton.
Jermyn's slope,	Jermyn borough,	John Jermyn,	John Jermyn,	Alfred Green,	Alfred Green,	Peter Merritt,
Jermyn's shaft,	Jermyn borough,	John Jermyn,	John Jermyn,	Robert Carter,	Robert Carter,	John Knight.
Erie shaft,	Carbondale township,	Hillside Coal & Iron Co.,	Samuel Hines,	W. E. Colborne,	David McDonald,	William Walker.
Chestnut Hill colliery,	Carbondale City,	E. E. Hendricks & Co.,	E. E. Thomas,	E. E. Thomas,	E. E. Thomas,	E. E. Thomas.

LUZERNE AND CARBON COUNTIES,
SOUTH DISTRICT.

His Excellency JOHN F. HARTRANFT,
Governor of the Commonwealth of Pennsylvania:

DEAR SIR—I have the honor to transmit for your consideration a report of my proceedings as Inspector of Mines, for the year ending December 31, 1877.

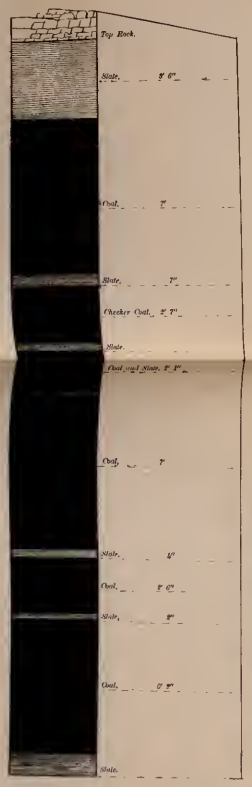
On enumerating the number of accidents, and loss of life arising therefrom, to persons employed in and about the collieries, it is satisfactory to find a diminution of eleven deaths over the previous year. There has been twenty-six fatal, and sixty non-fatal accidents to persons during the year 1877, a decrease of 29.73 per cent. in the former, and 18.92 per cent. in the latter.

The per centum of fatal accidents, attributed to the different causes, is as follows: By falls of coal, rock, and slate, 65.4 per cent.; by mine cars, 23 per cent.; by miscellaneous above ground, 11.6 per cent.

The total coal production for last year was about 4,070,014.15 tons, of which 3,768,530.15 was shipped to market; and the ratio of coal produced to each life lost was 156,539 tons. The deaths occasioned by falls of coal and mine cars is a prolific source of loss of life, and as these are, to a certain extent, unavoidable, it is to be hoped that by judicious management on the part of mine bosses, in removing the least suspicion of danger, and the men to use the necessary precaution, it is reasonable to assume that there will be a reduction in their number commensurate with the improvements that are steadily progressing in coal mining. At the end of this report will be found a tabular list of collieries at which accidents have happened, of the names of the unfortunate sufferers, and the causes of the casualty.

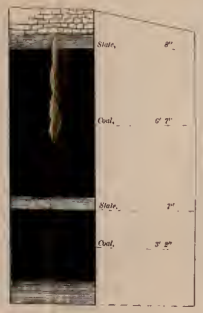
Under these circumstances, I am called upon to make a few special remarks upon cases, as they are, for the most part, single accidents, over which no general system can exercise control. They will be found under their proper head. The most deplorable accident was the caving in of the Harleigh mines, whereby two men were entombed.

I had given positive orders to the mine boss, the day previous to the disaster, to keep all his men out of the mines until the overlying strata



VERTICAL SECTION OF MAMMOTH SEAM AT EBERVALE COLLIERY.

Scale—½ inch—1 foot.



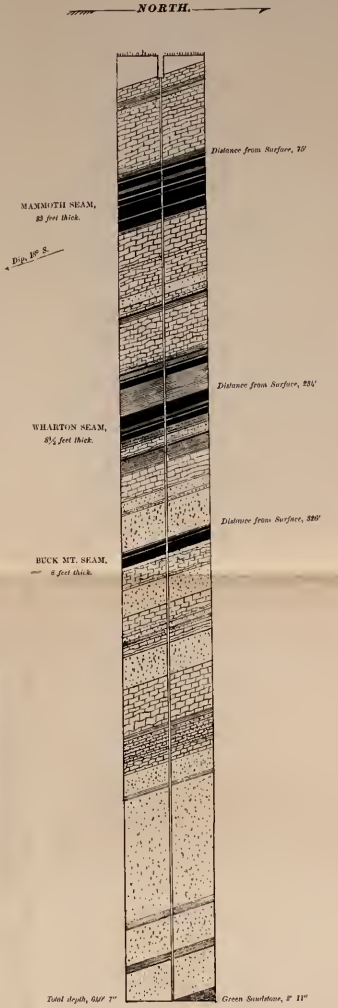
SECTION OF WHARTON SEAM AT COLERAINE COLLIERY.

Scale—½ inch—1 foot.

SECTION OF BUCK MOUNTAIN SEAM AT UPPER LEHIGH COLLIERY.

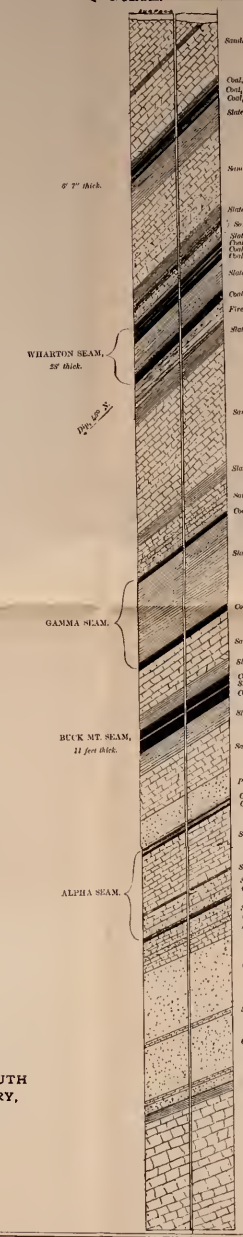
Scale—½ inch—1 foot.

BY T. D JONES.


NORTH.
Distance from Surface, 70'
MAMMOTH SEAM, 23 feet thick.
Dip, 18° S.
Distance from Surface, 234'
WHARTON SEAM, 8½ feet thick.
Distance from Surface, 330'
BUCK MT. SEAM, 6 feet thick.
Total depth, 640' 7"
Green Sandstone, 2' 11"

SECTION OF BORE HOLE SOUTH OF CRYSTAL RIDGE COLLIERY, NEAR HAZLETON.

Scale—60 feet to an inch.



SECTION OF BORE HOLE WEST OF GOWEN COLLIERY, LUZERNE CO., PA.

Scale—400 feet to an inch.

had fallen. All attempts to rescue the men had proved futile. For further information relative to this accident see an account of an investigation in another part of this report.

To elucidate the position of the gangways in the Harleigh mines at the time of the cave in, I have made a cross section through the boundary line, exhibiting the portion worked over the line by both companies, also a section of the line of bore holes put through the barrier pillar between Harleigh and Ebervale collieries to tap the water which had accumulated in the Harleigh mines by the caving in of the superincumbent strata, together with several sections of coal seams.

I remain your humble and obedient servant.

T. D. JONES,
Inspector of Coal Mines.

Hazleton, *February 16, 1878.*

By Falls of Coal.

Accident No. 1 on the list, Gomer Thomas, a lad, aged 15 years, at work with his father, was fatally injured by a fall of rock in the counter gangway at slope No. 4, Upper Lehigh, on the 15th of January, 1877, while in the act of handing over some borrowed oil to a neighboring miner, D. W. Thomas. Part of his face was terribly crushed, and one hip dislocated. He died in seven hours after the accident. The miners at work in this section of the mine state that they made several ineffectual attempts to bar down this rock, but failed. Great precaution is taken in these collieries, by the employers, for the safety of their men, but notwithstanding the accidents have been more numerous for the past year than elsewhere.

Accident No. 2 on the list, Thomas Baskin, laborer, aged 30 years, dangerously injured at Council Ridge colliery No. 4, on the 17th of January, and died January 25. The deceased was laboring in a gangway, and had fired a blast a little while previous to the happening, and was very anxious to see its execution, returned to the face immediately after the blast went off, and while in a stooping position, looking at the result of the blast, a piece of coal fell from the top, stripping his back and cutting him on the side. The hurt was not considered dangerous at first, but culminated in his death eight days after. The gangway was well timbered. This accident, as well as many others, might be avoided if the parties themselves would allow sufficient time to elapse for the settling of the disturbed coal, after firing the blasts.

Accident No. 25 on the list, Charles Jones, miner, aged about 40, fatally injured at No. 5, Council Ridge colliery, November 13, 1877. The deceased was a miner in the gangway, and while in the act of taking a skip off the lower side of the gangway, a flag of slate fell from the roof breaking his back. One of his laborers told him of the piece being bad, but he had something else in view before taking it down. He was taken to the hospital where he died December 31, 1877, from his injuries.

Accident No. 6 on the list, Michael O'Donnell, driver, aged 22, was in-

stantly killed at No. 1 Cross Creek colliery, April 24, by a fall of coal off the gangway pillar. The place of the accident was said to have been examined by David Williams and Henry Samual, who were ordered by the mine boss to take the coal down. The deceased was walking along the gangway when the accident occurred. The necessary suggestions were made by the inspector to secure the gangway by taking down all the coal to the top rock, which has since been done.

Accident No. 8 on the list, John Stevenson, miner, aged 50, instantly killed by a piece of coal falling on his head, in Crystal Ridge colliery, May 19, 1877. The deceased, in company with another miner were working a breast, and while in the act of carrying a ladder across the breast to blast down the six foot bench of coal, the said piece fell from the top, resulting as stated.

Accident No. 9 on the list, Philip Harlam, laborer, aged 25, instantly killed by a piece of coal from the top or six foot bench of coal, at Harleigh colliery, May 29, 1877. The deceased and his partner were driving through the pillar to enter an abandoned breast containing loose coal. I ordered the place of working to be stopped, as I did not consider it safe, owing to the breast having been worked too wide.

Accidents Nos. 9 and 10. Joseph Pearson and James Murich, ages 38 and 30 respectively. The former leaves a wife and eight children, and the latter an aged mother to mourn their loss; were entombed in the Harleigh mine disaster which occurred on the 20th of June, 1877, by the caving in of the mines. Orders had been given to the mine boss, the day previous, (by the inspector,) not to permit any one to work in said mines until the cave in had taken place. For further information, see an account of an investigation held by the inspector, accompanying this report.

Accident No. 13 on the list, Sidney Glace, miner, aged 42, killed by a fall of coal in Slope No. 2, Upper Lehigh colliery, July 16, 1877. The deceased was driving a counter gangway, he had fired a blast in the face of the gangway, and, anxious to see the result, returned immediately after the shot went off, when a lump of coal fell upon him, resulting in his immediate death.

The day of the casualty was the first for him to work, after being idle for some time, from a severe cut on the hand. This is the second death this year caused by recklessness on the part of the sufferers themselves in going back too soon to see the execution of the blasts, and not allowing sufficient time for the smoke to clear away, that they might be better able to remove the danger if any exists.

Accident No. 14 on the list, William Edwards, miner, aged 23, fatally injured by a fall of coal at Upper Lehigh colliery No. 2, and died shortly afterwards. The deceased was prying loose coal in the "six-foot" (or bottom bench in the Buck Mountain vein,) when about two tons of the "nine-foot," or top bench, fell on him, caused by a back slip, which was unobservable. The total thickness of the vein was ten feet, and the breast

twenty-five feet wide, and up thirty feet from the gangway, pitching about 5°. The top rock is very good at the place of the accident. A thin slate adheres to the rock in some places, which requires centerpropping, and at the scene of the accident this had been satisfactorily done by the deceased. His laborer, who was loading the car at the time, came near sharing the same fate.

Accident No. 15 on the list, Barney McTauge, miner, aged 35, fatally injured by a fall of coal at Lattimer colliery, August 25, 1877. The deceased was about to drill a hole in the four-foot bench, when about a ton of the two-foot bench fell on him, crushing him so severely that he died in two hours after he had been taken home. The breast was driven one hundred and twenty feet up the pitch from the gangway, and thirty feet wide. The coal was of a slippery nature, but not of a deceiving character, as sometimes happens to be. In my estimation, a safer place to work could not be found, as the breast was driven up in line with an air hole, affording a very safe retreat for the men in case of danger.

Accident No. 16 on the list, John Quinn, aged 44, instantly killed by a fall of coal off the pillar, at upper Lehigh colliery, September 11, 1877. The breast was twenty-one feet wide and forty-five feet up from the gangway. The top rock, or roof, was very bad in this breast, which necessitated center-props to be stood every six feet, which is a thing seldom required in the Buck Mountain vein, as the top rock is of extraordinary hardness. The lump of coal which fell on the deceased ought to have been taken down before he advanced too far on the face of his working, but, unfortunately for him, he left it, as he supposed, as a support for the roof, instead of standing a prop, (as stated by another miner, to whom he told his intentions.) A great many accidents occur by leaving hangings on the pillars, that could be trimmed off, and it is also an injury to the pillar to leave those wings on.

Accident No. 18 on the list, Michael Boyle, aged 35, was fatally injured at No. 2, Council Ridge colliery, October 10, 1877. The deceased was laboring for a miner, in a breast. Considerable top coal had been left hanging, which was of a very treacherous character, and should have been taken down by the miner, who is censurable for not doing so, and it would be commendable if mine bosses would insist upon men removing the least suspicion of danger momentarily, and not to permit of any procrastination. By doing so the men would be rewarded for their trouble, and the company compensated for the act.

Undoubtedly, the miner's intention was to economise in the use of powder, by advancing as far as possible on the bottom coal, so that the top coal would require but little blasting. This, in my estimation, is a culpable practice, and should strictly be forbidden by the mine bosses.

Accident No. 19 on the list, Thomas Trelure, aged 23, was instantly killed by a fall of slate, in Cranberry colliery, October 23, 1877. The deceased, one of three, were employed at robbing an old counter-gangway,

which had been driven through the pillars and breasts. They had fired two blasts the night previous, before leaving work, and on returning in the morning they were disappointed that the blasts did not do the desired execution. The deceased commenced to bar the loose coal, while his laborer was loading a car, when a flag of slate, about ten inches thick, fell on the car and he removed to the other side of the gangway, when a second flag fell. He stood meditating for a few minutes, when he advanced about ten feet from the car, when the third and fatal flag fell, resulting as above. He was said to be a practical miner at such work, and had done a great deal of it.

Accident No. 21 on the list, Neal Gallagher, aged 45, was instantly killed by a fall of coal in tunnel No. 9, located in Panther Creek valley, November 10, 1877. The deceased was working in a gangway that was driven to connect with another gangway. When the two gangways were within twenty feet of being through, they drove a small hole on the lower side for the purpose of draining the dip gangway, instead of bailing the water, which they were obliged to do before the hole was through; and when they commenced to widen out the hole, to connect both headings, or gangways, a lump of coal, from the upper side, fell on the deceased, resulting as above stated. The mine boss gave the men orders the day previous, to stand center-props, and instead of standing them as they should be (close to the coal on the pitch,) they left a space of about four feet from the coal on the pitch to the center-props, when the props could be utilized for the support of the coal on the pitch as well as that for the roof.

Accident No. 23 on the list, Michael McCann, was instantly killed by a fall of coal at No. 5 East Sugar Loaf colliery, November 26, 1877. The deceased's partner stated that they had fired a shot in the top coal some time previous, which did not do the required execution. They worked unconcernedly on the face, leaving the disturbed coal by the shot remain without securing it, and at the same time working right under it. In order to avoid danger, a "buggy" hole had been driven through the pillar from the adjoining breast, at a point to enter the face of the breast in which he was killed. And further, for their safety, they were allowed two breasts, that when they blasted in the one, they could load coal in the other.

Accident No. 24 on the list, Hopkin Richards, miner, aged 57, injured at Cross Creek colliery, July 23, and died July 28. The deceased was an old man, who had been sick with asthma for about nine months, and had only begun to work again in the mines a few days before the accident happened. He was barring down the dividing slate in his breast, and being exhausted he sat down to rest and take breath. During the interval, the piece which he had been barring fell, breaking the small bone at the ankle. It is presumed that the accident to this person is not attributable to the cause of his death, as it is evident that such a trivial accident to a man of younger years would have been of little consequence.

By Mine Cars.

Accident No. 3 on the list, James Stevens, driver, was fatally hurt by falling from a car which jumped the track at bottom of slope. At the time of the happening the injuries were not deemed serious, as the deceased worked all that day and part of the next, but, as presumed, took cold, and died about two weeks after the casualty. The above accident happened at Sugar Loaf colliery, February 19, 1877.

Accident No. 7 on the list, Abraham Depue, pumpman, instantly killed by being run over on the slope, at Sugar Loaf colliery, March 18, 1877. The deceased left the top of the slope about eleven, A. M., on an empty car, riding as far as the steam pump at the second lift, where he remained a short time, and then went on an empty car as far as the draw bridge, or fourth lift, and staid there about ten minutes. A full car coming up about this time, the engineer was signaled to stop at the fourth lift, another signal was given to hoist. The engineer suspected the pumpman was on the car, hence he hoisted very slowly, and stopped at mouth of the slope for him to get off, but not finding him on the car continued to hoist. When the car on which he was supposed to be riding on had reached the breaker, and dumped, they found a hat The outside boss supposed it to be Depue's, and took it to the top of the slope, when the engineer informed him that there was a car off the track on the slope, and he went down to put it on the road, when he discovered Depue had been killed by the ascending or descending car. I am of the opinion that the deceased was riding up the slope upon a loaded car, and that his head caught the collars, throwing him off the car, and was either instantly killed by the crush or killed by the descending car, which was found off the track. This should be another warning to persons violating the law by riding up the slopes on loaded cars, and should be strictly forbidden by the parties in charge.

Accident No. 12 on the list, Michael Deitrick, outside boss at Ebervale colliery, aged 61, instantly killed by being run over by a car on the slope. The deceased, in company with some others, went down the slope to put a car on the track, after which he went to the bottom of the slope, and remained there a short time, and, instead of riding up the slope, or walking up the m in-way, he walked up the slope while it was in motion, and was knocked by the descending, or ascending, car throwing it off the track. It appears that he was a very persevering man, anxious to get out all the coal possible, and, rather than detain the works by his riding up, he said he could walk it, and by doing so he sacrificed his life. He requested the engineer in the morning to put on full head of steam, at the risk of bringing in the slope.

Accident No. 17 on the list, Adam Diehl, pumpman at No. 2, Stockton, or East Sugar Loaf colliery, was fatally injured by being run over by mine car on the slope. The deceased had to attend to two pumps, one located in the third lift, the other in the fourth lift, and, in order to attend either of these pumps, he had to travel on the slope track during the time the

cars were being hoisted, providing anything went wrong with either of the two pumps. The distance between these two lifts was four hundred feet, dipping at an angle of about twenty-five degrees. There was ample room for him to stand along side of the column pipes when the empty or loaded car was passing. What induced him to go unto the west track, or the track on which he was found senseless, no one can tell, unless it was to get out of the way of the loaded car coming up the slope, and was instantly knocked by the descending car. This was the only conclusion I could come to, as there happened to be no one near when the accident occurred to tell anything about it. It is a common error to have pumps placed in the main hoisting slopes, as they should be situated in an independent pump-way, which would also serve for a traveling way for the men, and a second opening. However, the new slopes that are sunk nowadays are made exclusively for hoisting, and separate pump ways are driven at required distance from the slope. I gave orders to the mine boss to cause to be made a way for the pumpman to travel alongside of the slope pillar, by which he could attend to his duty without traveling the main slope from one lift to the other, which I think will be the means of saving life and limb in the future.

Accident No. 20, Thomas J. Griffiths, driver, aged 16, fatally injured by attempting to jump on a mine car while in motion, at "Room Run mines," Nesquehoning, November 9, 1877. His both legs were terribly mutitated He was taken to the Pennsylvania Hospital, where he died in one week from the date of the accident.

Accident No. 26 on the list, Daniel Conahan, aged 35, repairsman at Stockton No. 2, instantly killed by being run over by the mine car on the slope, December 24. The deceased and another man were employed as repairsmen at night on the slope, and had been working at said occupation during seven years. At quitting time they got on front of the car, riding on the spreader of the bridle chain, to come up the slope, and while attempting to change his position he fell, and his partner caught him, but it proved to be more than he could do to save him from the fatal result as stated. The engineer, who apparantly is a competent man, said that he was hoisting very slow at the time, but no one being near the rapper to give him the signal to stop in time, he is not to be blamed for the occurrence. The rate of hoisting at the time did not exceed five miles per hour, which is an ordinary rate of a man walking.

Miscellaneous above Ground.

Accident No. 4 on the list, William Hoffman, aged 33, was fatally injured, March 19, 1877, at No. 9 breaker, located in Panther Creek valley, while attempting to prevent the transportation cars from running away. The deceased was employed at loading lump coal, and seeing the cars in motion, attempted to jump on the front car to stop them, (by using the brake,) when his foot slipped, precipitating him under the car. He died from the effects of the crushing the day following.

Accident No. 5 on the list, Daniel Gallagher, boy, aged 12, instantly killed at Cross Creek colliery, April 12, 1877, by being crushed by the breaker rollers. At the time of the occurrence the breaker men had gone to the foot of the plane to put a car on the track, and during the interval the boys got playing. The deceased went up to the second platform, and by crossing the chute, which conveyed the coal to the "Ponney rollers," his foot slipped, precipitating him into the rolls, and was not observed till he was half way through the screen. The necessary preventive to obviate such disaster had been neglected being put in its place when the men left their work to put the car on the track. Owing to the demand for different sizes of coal, they had to remove or enlarge the hole leading into the rolls, but in order to avoid any such accident, Mr. Coxe had strictly forbidden boys being employed anywhere near exposed machinery, whereby the same could not be fenced off.

Accident No. 22 on the list, John Lewis, boy, aged 13, was instantly killed at No. 2 Upper Lehigh colliery, November 20, 1877. The lad was playing with the rest of the boys, at the noon hour, on the draw-bridge, which is used for conveying slate cars, timber trucks, &c., off the slope. The carpenters, who were doing some repairs about the slope, chased the boys away, but, after the carpenters left, the boys returned to play see-saw on the bridge, some getting on the pole, and about a dozen on the bridge, and the deceased had hold of the rope, (guiding the see-saw,) and left go when the pole was on the ascending motion, causing the bridge to drop very suddenly, with the boys on, and by the spring the pole broke, falling on the lad's head, dislocating his neck.

Investigation.

An investigation held before T. D. Jones, inspector of coal mines for the Lehigh coal district, on June 28, 1877, for the purpose of ascertaining the cause of the cave in of the Harleigh mines, and of the deaths of Joseph Pierson and James Murrish, who were entombed in No. 3 slope on June 20, 1877:

The first witness called, George Davis, being duly sworn, deposed as follows:

Q. When did you work in the Harleigh mine last?
A. One week ago, yesterday.
Q. That was on Tuesday?
A. Yes, sir.
Q. How long have you been working at Harleigh?
A. Since March, 1869.
Q. Where did you work there?
A. On the upper level, main gangway.
Q. How long have you considered it dangerous?
A. Since Tuesday, the 19th instant.
Q. Were you told by the boss not to go in?

A. Had a conversation with the mine boss on Monday evening, the 18th, and in conversation the boss stated that he supposed No. 3 slope would be idle until everything had fallen or settled.

Q. Do you think all the necessary precautions had been taken previous to the accident?

A. Yes, sir.

Q. Did you consider it safe the last time you worked there?

A. No, sir; did not consider it safe to work there any longer; apprehended no danger where we worked, but afraid of the danger of the concussion in case of fall in the lower lift.

Q. Did you consider it safe for your laborer to work in the gangway?

A. Yes, sir; however, the place where he worked is still standing.

Q. Are you aware that the laborer is under your charge, while in the mines, according to law?

A. I have always considered it as such.

Q. If the boss gave you orders, did you carry them out?

A. I at all times tried my best to do so.

Q. Do you think anything more could be done toward getting the men out?

A. No, sir.

Q. Do you know of any way that they could be gotten off?

A. Consider it an impossibility to get them out.

Q. What reason have you to believe that they cannot be gotten out?

A. I have traveled east and west of them as far as any man can go, and find that the top has fell, making it an impossibility to get to the point where they worked.

Q. When did you see the inspector in your place?

A. Couldn't say direct; believe he was there when I was idle; some time in the latter part of May.

Q. Previous to that, when the inspector visited the mine, did he ascend your breast?

A. Yes, sir.

Q. Was there anything done toward making the gangway and slope safe after the inspector's visit?

A. Yes, sir.

Q. Please state what was done?

A. Timbering the gangway on the level where I worked, and the stopping of some places considered unsafe.

Q. On your way in the mine, on Tuesday, did you see any indications of a fall that had taken place Monday night?

A. No, sir.

Q. Did you see an oil barrel blown between the pillar and a car?

A. Did not see it, but heard that such was the case?

Q. When you quit work on Tuesday, what remarks did you make?

A. When quitting work my partner requested me to go into the dog-

hole, to listen to the workings in the lift below; while there I came to the conclusion that it was unsafe to come to work again, until the working fell or settled; on the top of the slope we met James Murrish and Joseph Pierson, (the entombed men;) Stickler, my partner, told them of the conclusions we arrived at that evening.

Q. What time of day was it?

A. About five o'clock, P. M.

Q. Were they on their way out?

A. We were all on our way home.

Q. Was this in the mines, or outside, that the above conversation took place?

A. Outside.

Q. What did they seem to think of the indications of the coming crush; or, in other words, what did they answer you?

A. Did not hear the reply.

Q. Where did the mine seem to be crushing the most?

A. In the lower lift; did not seem to affect the gangway we were working in; a short distance below the gangway, however, it was working hard.

Q. What time did you come out?

A. As near as I could judge, five o'clock, when we reached the mouth of the slope.

(Signed) George M. Davis.

Isaac Stickler, *sworn:*

Q. How long have you lived in Harleigh?

A. Six years, the coming 6th of July.

Q. How long have you been mining?

A. Five years and three months.

Q. What kind of work have you been doing?

A. I first worked two breasts; drove a piece of gangway with Mr. Davis, and assisted in opening breasts.

Q. How far from the gangway did you commence widening out the breasts?

A. About ten yards from gangway.

Q. How wide were you allowed to work your breast?

A. Ten yards.

Q. How much pillar did that leave you between the breasts?

A. Seven (7) yards on the outside pillar.

Q. Did you drive cross-cuts through the pillar?

A. Yes, sir; we drove four through the outside pillar.

Q. What were they for?

A. For air.

Q. Were they used for anything else?

A. Yes, sir; our own safety while mining.

Q. Do you think the Harleigh mines were ever worked practically?

A. No, sir; excepting lately, since Mr. Lloyd, the new boss, took charge; his work is the only portion left standing to:day.

Q. Do you think that if Mr. Lloyd had charge of the Harleigh mine in the first start, would it be in good, or in a better condition, to-day?

A. According to the work done since his accession, I believe it would.

Q. What was the condition of the mine before Mr. Lloyd assumed the foremanship?

A. Poor condition.

Q. Did you ever see the inspector in your place?

A. Yes, sir.

Q. Did you ever hear tell of any instructions that the inspector gave for the safety of the mines? If so, state what?

A. Yes, sir; in regard to timbering to be done in main gangway, No. 3.

Q. Was that substantially done, afterwards?

A. Yes, sir.

Q. Do you think that all necessary precaution had been taken previous to the accident?

A. Yes, sir; in regard to where the mine was working.

Q. Had you any conversation with any one in regard to the safety of the men previous to the accident?

A. No, sir; excepting Murrish, Pierson, and Davis, on Tuesday evening, previous to the crush.

Q. Did you consider the mine safe up to the day of the disaster?

A. No, sir.

Q. Did you work on the day previous to the disaster?

A. Yes, sir.

Q. What was your particular business in on that day?

A. To make coal, so as to allow the laborer to load the empty cars on the track.

Q. Were your laborers in on that day?

A. Yes, sir.

Q. Did the laborers do their own driving on idle days, taking the cars to and from the bottom, so far as necessary?

A. Yes, sir.

Q. By whose authority were you doing this?

A. By the boss' authority, John Lloyd.

Q. Did you understand that the men were forbidden to enter the mine on Tuesday.

A. No, sir; but understood that it was forbidden to work in the lower lift and counter.

Q. What was the reason you were not in the mine on Wednesday, the day of the fall?

A. Because we believed it unsafe; believed the concussion of air would endanger us; were not afraid of our workings caving in.

Q. If you had been in the mine the day it caved in, could you have gotten out?

A. Yes, sir; provided I was not hurt by the concussion of the air.

Q. Which way could you have come out?

A. Through the Ebervale west gangway.

Q. Tell us what conversation, if any, passed between Murrish, Pierson, and yourself on your way home Tuesday evening.

A. Pierson asked Murrish whether he (Murrish) had any straws in the house; he said, if so, bring them along to-morrow. I asked whether they intended working next day, and they replied, yes. I told them that Davis and myself had come to the conclusion to stay home until the lower lift and counter had either fell in or stopped working. Pierson and Murrish made no reply.

Q. Did they come out the same gangway you did?

A. Yes, sir, part of the way.

Q. Do you think anything could be done, more than has been, towards getting the men out?

A. No, sir.

Q. Do you know of any way by which they could be taken out?

A. No, sir; except by taking out the whole fall.

Q. Could that be done, and if so, how long would it take to do it?

A. Could not tell how long.

(Signed,) I. M. Stickler

John Reymiller, *sworn:*

Q. How long have you been working in Harleigh?

A. Eighteen years, off and on, last May.

Q. Did you consider your place safe up to the day of the disaster?

A. Yes, sir; it is safe to-day, as far as I know.

Q. How long have you been mining?

A. Nineteen years.

Q. What was the last work you done at Harleigh?

A. Working in breast.

Q. Have you been driving gangway in Harleigh?

A. Yes, sir.

Q. Did you timber that gangway?

A. No, sir, excepting an odd prop now and then.

Q. Did you think it would ever need timbering?

A. No, sir; my gangway was driven through pillars and solid coal.

Q. What connection has No. 1 with No. 3?

A. All the connections are the gangways in same basin and same pitch; breasts were worked up in gangway from one level to the other.

Q. Were those workings very wide?

A. Some were wide, and others narrow.

Q. Do you think a crush on No. 3 would have any effect on No. 1?

A. I do, from what I've seen as to the way it stood.

Q. Then you would also consider No. 1 unsafe?

A. I do.

Q. In what part of No. 1 are you working?

A. On the west side of No. 1, east of No. 2.

Q. Do you think a crush on No. 1 would have any effect on No. 3?

A. I do.

Q. Has there at any time been any precaution taken to prevent a crush passing from one slope to the other?

A. Have no recollection of any whatever.

Q. Do you know of any pillars that have been preserved for that purpose?

A. Know of none; am not fully acquainted with the mine.

Q. Do you think the parties in charge have done their duty in regard to the safety of the men in their employ?

A. I believe they have, to the best of their ability.

Q. Do you think any one responsible for the men being in the mines at the time it caved in?

A. I know of no one.

Q. Did you hear of the mines being suspended, owing to the crush, or was it for the want of orders?

A. I did not hear of work being suspended until after the accident; receive no orders, unless I go to the store or call at Lloyd's house, when there is work.

Q. Do you think all possible attempts have been made to get those men out?

A. I do.

Q. Do you know of any way by which they could be gotten out?

A. I do not.

Q. Were you notified at any time not to go to work on account of danger?

A. No, sir.

Q. When did you work last?

A. Two weeks ago to-day, I believe.

Q. Did you hear any of the employés saying they were afraid to go to work in No. 3?

A. I did.

Q. Who did you hear saying so?

A. James Campbell.

Q. Do you know where he worked?

A. He worked with me as laborer, and in John McElwee's breast, when he could get a day's work.

Q. How long before the cave in were the men afraid of working in No. 3.

A. I heard of No. 3 crushing for six months, and that the last five or six weeks it was unsafe to work there.

(Signed,) J. W. REYMILLER.

Harry Hughes, *sworn:*

Previous to the disaster, Lloyd stated to me that the driver boss and himself were going down the slope, and asked me to come to the underground engine-house, at about nine o'clock, A. M., and go along with them to listen to the workings; on going there, at the time stated, we found that they had already left.

Q. What are you doing in the mines?

A. Running cars in No. 1 slope.

Q. How long were you in before the cave in took place?

A. A couple of hours.

Q. Did you know that Pierson and Murrish were in?

A. No, sir; not at that time.

Q. How did you learn that they were in?

A. We suspected as much, and supposed that Lloyd and Cook had gone to see them.

Q. Did you tell the imprisoned men that the mines were crushing and caving in, and that they had better come out?

A. We told them the lower lift and counter was crushing in, and asked them to come along and listen for themselves.

Q. What did they say?

A. They made light of it, laughed at us, saying if they went that far they would go out altogether.

Q. What did you do then?

A. We walked about the gangway from place to place.

Q. Where did you go after leaving the men?

A. Went down to the lower lift in search of Lloyd and Cook; not finding them there, we went to the bottom pumps, where we met James Munroe, and were informed by him that Lloyd had gone up a half hour before. We went back to the stables, met the stable boss, and together went down part way to listen. Shortly after went through some old works to No. 1.

Q. How long were you out of the mines before it caved in?

A. We were in No. 1 mines.

Q. Did you know that the boss had strictly forbidden any person going into the mines on account of the crushing?

A. I understood it was forbidden.

Q. What did the inspector say to Mr. Lloyd on Tuesday evening, when coming from Drifton?

A. He told him to keep all the men out, on account of the working in those lifts.

Q. What was the answer of Mr. Lloyd?

A. That the men of No. 3 would not work any more until it had fell or settled.

Q. Do you believe all that could be done has been towards getting those men out?

A. I do.

Q. How many attempts did you make?

A. I made several attempts.

Q. Do you recollect through how many ways these attempts could be made?

A. Yes sir; four—Gartrell's hole, No. 3 counter, No. 1 gangway, and through Ebervale.

Q. Where was the mine working or crushing the most when you were coming out?

A. In the counter and lower lift.

Q. If orders were issued not to go in, how did Pearson and Murrish come to go in?

A. They seemed to think there was no danger, and deemed themselves as safe as if at home.

Q. Were you notified at any time not to go to work on account of danger

A. No, sir.

Q. Did you hear any one say that they were afraid to work in No. 3?

A. I did not.

Cross-examined by J. C. Fincher, and other gentlemen:

Did not know Pierson and Murrish were there; had no authority to tell them to quit; thought it safe; had a very heavy pillar at that place; everything appeared solid in their neighborhood; the working seemed to be in the lower gangway and counter; I do not know that the orders were not to go in that part of the mine; the indications are that the place they were working in has all caved in; I left the mines at about twelve o'clock.

(Signed) HARRY D. HUGHES.

JOHN LLOYD, *mine boss, sworn:*

Q. Did you, according to law, use all necessary precautions for the safety of your men?

A. I did, sir.

Q. When did the mines give the first indications of crushing?

A. The clod on the lower lift has been crushing for the past five or six months.

Q Do you think the Harleigh mines were ever worked practically?

A. No, sir; not up to the time I went there.

Q. What was the condition of the mines when you took charge?

A. Everything was out of order, the longest tail-pipe on any pump was not more than six inches, the tracks were covered with water-ditches and sump full of dirt; breasts were opened from the gangways too wide to be safe, and the top coal was broke too close to the gangway. Breasts were worked some twenty and twenty-one yards wide, and the pillars all out between six breasts, in one stretch, and the rock fallen down in several places. Our breakers, at that time, quit at four and half-past four o'clock daily, for the want of coal. No. 3 slope was not large enough for the car to pass through, without cutting away about six inches off the timbers, with not

more than room enough, (in certain places) to place your hand on top of the car. Five rolls in the slope, causing the rope to grind about eighteen inches into the solid coal. I considered it the worst colliery in the country, available for work.

Q. How long have you had charge?

A. Two years last January.

Q. Was it not considered that the coal was all out?

A. No. 1 was considered worked out, but No. 3 was supposed to have enough available coal to last for six months or more, as stated by the foreman in charge, previous to my taking charge.

Q. How much coal, in your estimation, has been taken out of No. 1 since it was supposed to be worked out.

A. I never made an estimate; about 150,000 tons, approximately.

Q. Was your attention called to the crushing of the mines by your own observations, or by that of your employés?

A. By both; also by the inspector.

Q. Did any of your employés, at any time, call your attention to the crushing of the mines?

A. Yes, sir; one of the drivers was afraid of the clod falling in on him in the basin, and quit.

Q. What did you say to the boy?

A. I told him to quit, if he was afraid.

Q. Did you put another driver in his place?

A. I did.

Q. Did you think it safe for him to work?

A. Yes, sir.

Q. Did any of your employés tell you they were afraid to work in any other part of the mine?

A. No, sir.

Q. How long since the change of drivers took place?

A. One month, more or less.

Q. Did you at any time threaten to discharge any one for not going to any particular part of the mines?

A. No, sir.

Q. Has it not been considered an act of cowardice to complain of the condition of the mines?

A. A month ago it was by myself.

Q. Did you examine the condition of the mines after the fall on Monday morning, after the men entered?

A. I did; in the lower lift, where the fall took place; myself and the driver-boss went through the lower lift on Monday morning; made a thorough examination, and found it working very heavy.

Q. Why did you allow Stickler and Davis to go in, while others were forbidden?

A. I did not forbid any person from going in the upper lifts until Wednesday morning, (the day of the fall.)

Q. Did the inspector tell you to keep your men out?

A. Yes, sir.

Q. Did you consider the mines safe on Monday?

A. All above the two lower lifts I considered safe.

Q. Do you recollect the evening the inspector spoke to you?

A. Yes, sir; Tuesday evening.

Q. Please state the conversation?

A. I informed him that the lower lifts of No. 3 were working; he said we should allow none to work in the mines; I had already ordered that No. 3 should not work any more, until it fell or settled.

Q. Do you recollect the date the inspector visited your slope last?

A. About seven weeks ago.

Q. State conversation passing between you at that time.

A. He told me he wished to make a survey of No. 3 slope, and that he wanted to see the workings throughout; we commenced in the basin, and went all through; he stopped the third breast we came to, because he considered it unsafe for the workmen; went through the workings until we reached gangway of the main slope; he ordered the gangway to be timbered in several places, and to timber the underground slope, which we did, to his satisfaction.

Q. Do you think if the timbering had not been done, would the top rock stood up as long as it has.

A. I believe the fall would have brought down the coal, but as to the rock, I could not say.

Q. Did the inspector restrict any other portion of your workings?

A. Yes, sir; he restricted one breast in the counter.

Cross-examined by Mr. Fincher and others.

We considered the lower lifts would fall in, but supposed the upper lifts safe; men were allowed in the upper lifts until Wednesday morning; did not know that Pierson and Murrish were in the mine; ordered all men in the mine to get out; the pump men were at the bottom of the main slope when the crush took place; thought that the stables were safe.

Q. (By the inspector.) Did the inspector request you to notify the superintendent that he wanted to see him and yourself, in his office, after he made the inspection?

A. He did.

Q. What passed between the present superintendent, inspector, and yourself?

A. The inspector found fault about the under-ground slope in No. 3; considered it unsafe for the workmen, unless it be timbered as ordered by him.

Q. Did you consider it safe then?

A. I did.

Q. In notifying the men, did you do it singly or in a body, before entering the mine?

A. Did not notify them Wednesday morning; there was no work there for days before then; the men understood that they were not allowed in that portion of the mine.

Cross-questioned by J. S. Sanders and others.

Did not know that Pierson and Murrish were in the mines; no one was forbidden to work in the upper lift; never supposed the upper lift would crush; the vein being very flat in places; there was no pillars between the lifts; the breasts are worked up from lift to lift; nothing left but the pillars between the breasts; the air-way alongside of the gangway, which should have five yards between them, in a great many places had but six inches.

Q. (By the inspector.) Do you think that any future attempts would be of any use in saving the men?

A. No, sir; I do not.

Q. Do you believe all that could be done, towards getting the men out, had been?

A. Yes, sir; I do.

Q. Did you see any unwillingness on the part of any one to render all the assistance necessary? If so, please state whom?

A. As far as the men, the inspector, and myself could, we done all in our power to rescue the men in every way possible to think of.

(Signed) John Lloyd.

Philip Workley, *sworn:*

Q. What is your occupation?

A. Stable-boss, (tending mules.)

Q. What time were you in the mines on the day of the cave in?

A. About half past seven o'clock in the morning.

Q. Was it crushing at that time?

A. Not were I traveled.

Q. Did you think the mines were going to cave in?

A. I knew nothing about it.

Q. Did you think there was any danger of the mules being killed?

A. No, sir.

Q. Did you hear any one say anything concerning the condition of the mines?

A. Heard no one but Lloyd, who stated, Monday evening, that No. 3 would work no more, until it fell or settled.

Q. Did you think there was any danger in walking from the bottom of the slope to the stables, on the morning of the disaster?

A. I had no fears whatever, until Mr. Hughes called my attention to it. I finished my work and then left.

Q. Did you think the wind would hurt the mules?

A. I did not.

Q. Where you in the mines on Monday morning previous to the disaster?

A. Yes sir.

Q. Did you notice anything unusual?

A. I did not.

Q. Did you not notice the oil barrel lying between the car and the pillar, or did you notice dust or pieces of boards on the track as you went in?

A. I did not.

Q. Where you notified to be careful owing to the crush?

A. No, sir.

Q. Did Mr. Lloyd give you permission on Wednesday morning?

A. No, sir; supposed it my duty to feed the mules.

Q. What time did you come out of the mines on Wednesday, after feeding the mules?

A. About eleven o'clock, A. M., after the cave in went down to get the mules out, but was unable to get to the stables; it was crushing from both sides; went back to try the No. 1 way, in company with others, but found the way barred by a fall; came back and reported to Lloyd; tried a second time, but was unable to reach the stables; was down this morning; indications are bad; it is not safe to attempt to reach the mules; have charge of the mules; had no orders to take the mules out (sixteen) until after the crush; the mules could have been brought out at No. 1 slope.

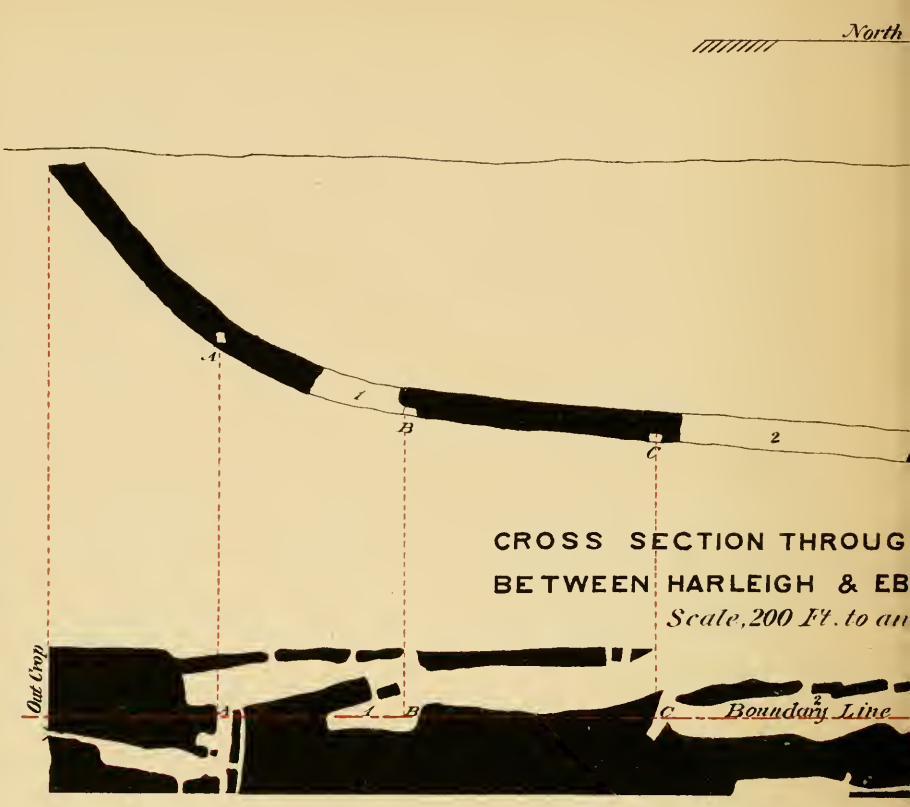
(Signed,) his PHILIP × WORLEY. mark.

JOHN M. GALLAGHER, *sworn:*

Q. How long have you worked at Harleigh?

A. About eight years; been mining five or six years; working breasts and gangways; did not timber the gangway, because we thought it unnecessary; was ordered by Lloyd to drive the breasts ten to eleven yards wide; this would leave the pillar seven yards wide; began widening breasts at from eight to nine yards from the gangway; before Mr. Lloyd's accession to the foremanship, I worked the breast as best I knew how; the bosses would visit us sometimes once a week, and sometimes once every two weeks; drove cross-cuts whenever needed for air and means of safety; cross-cuts were paid by the yard and coal; worked last in the top lift, top counter, No. 3, driving breasts; was not in on Wednesday, on account of a funeral; was not afraid of the upper lifts crushing; was told by Cook that Lloyd would allow no one in the lower lifts; went in old No. 1 gangway, below Gartrell's hole, but could go only a short distance beyond, on account of a fall ahead; tried breasts below; crept through a small hole, expecting that I might get through the cross-cut, but was forced to retire; do not believe the men can be gotten out; heard some say they were afraid of the mines caving in; strangers working in the mines, if they seen anything drop, would come out and speak of the danger, but I thought nothing of it; never heard any of the older miners speak of danger in the upper lifts.

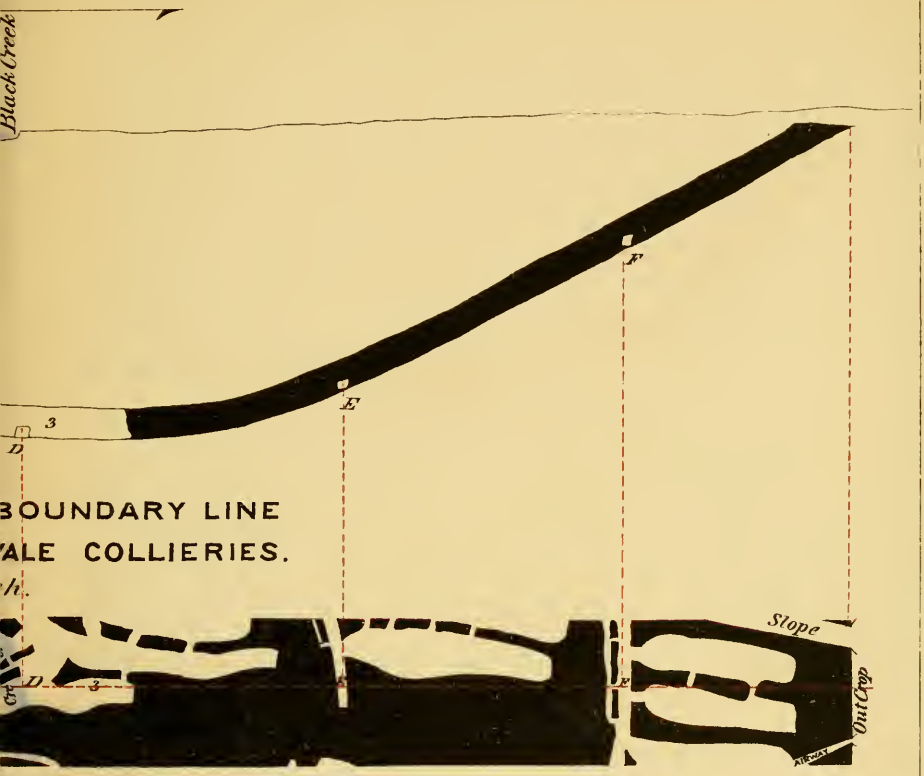
(Signed,) JOHN GALLAGHER



Reference.

A = *Eberrale 1st lift W Gangway holed into Harleigh workings.*
B = *Harleigh Main Gang. on N Dip worked around the synclinal.*
C = " *Inside Slope, Counter Gangway.*
D = " " " *Synclinal* " *worked over the boundary line.*
E' = " *Main Gangway at bottom of slope.*
F' = " *No 1 East Gangway connecting with Eberrale west gangway.*
Spaces Nos. 1 2 and 3 = Harleigh workings over the boundary line.

By T. D. Jones



BOUNDARY LINE
VALE COLLIERIES.
h.

PILLAR AT BOUNDARY LINE.
to an Inch.

Mr. Becroft, *sworn*, stated as follows:

Have been connected with coal mines and mining for twenty-four years; was general inside foreman at Stockton about three years, under superintendent William Carr; never witnessed a greater caving in than the one at Harleigh; after personal observations, I was convinced that the men could not be rescued; I believe that all possible attempts to rescue the men have been made; all the men were willing to help to get them out; was there the evening of the accident.

Mr. Lloyd was again called on and stated that "he was satisfied that the men could not be gotten out; Mr. Becroft, at my request, accompanied me into the mines for the purpose of rescuing the men; went seven different ways, but could do nothing; tried every way and everything imaginable, but were forced to desist."

Explanations of Cross Section.

The intention of presenting this section is to demonstrate the positions of the gangways in the Harleigh colliery, and that portion worked over the boundary line. Gangway F, on cross section, was driven from Harleigh No. 1 and No. 3 sunk under or rather over it to work the coal at a point lower in the "basin," as the same dipped very rapidly eastward, meets on a level with the first lift west gangway worked from Ebervale slope, No. 2. At this point a very substantial dam was built previous to the caving in of the Harleigh mine, for the purpose of damming back the water from running into the Ebervale collieries, preparatory to the abandonment of the Harleigh workings, as the coal had been nearly worked out.

This dam cost about $4,000, and contained 48,000 feet of white pine lumber, each stick of lumber was 12 feet long, 12″×12″ diameter at one end, and 10″×12″ at the other. The dimensions of the dam cut out of the solid coal by pick work, was 12 feet long, 23.6 feet wide at the ouside, and 28.2 feet on the inside, equivalent to 2 feet of a hitch on the outside, and 6 feet on the inside, so that the greater would be the pressure, the tighter the dam would get, acting in the form of a wedge. At intervals one of the sticks was left out, to serve as a key in closing the dam, and driven in with a ram, and afterwards caulked with oakum, and wedges driven in the end of the sticks on the inside of the dam, making it perfectly watertight. Sometime after the completion of this dam, preparations were being made to build another in gangway A, on section, when the Harleigh mines caved in, necessitating the abandoning of building the second, as both were futile, owing to the barrier pillar being considered too weak to resist three hundred and twenty feet head of water. The pressure on the dams was calculated to be about sixty-five to seventy pounds per square inch. The plan of the dam was gotten up by Thomas S. McNair, Esquire, civil and mining engineer, and put in by Mr. Samuel H. Bateman, both of Hazleton, Pa.

Explanations of the Cave in.

The caving in of the Harleigh colliery occurred on the 20th day of June, 1877, which was nothing more than was anticipated, as the crushing of the mine pillars gave ample indications that the overlying strata had partially given away, and that a general crush was inevitable. I had visited and perambulated this mine, on the 21st of April, and restricted some of the workings owing to the crush, and instructed the company to put on a sufficient force to timber the main gangways and slopes. Subsequently the timbering was done, and continued until nearly the time of the cave in; but, as the greater portion of the mine consisted in "robbing" for the last three years, or previous to the date of my commission, timbering was of little use, except as a precautionary warning, and a safe retreat for the men, for the supporting of the superincumbent strata was beyond control. There were four means of egress for the men in this mine, and, as the caving in was not an unforeseen expectation, work was continued. On the 30th day of May, I again inspected this colliery, and observed that the gangways were tolerably timbered, but, as the seam was so thick, (thirty feet,) it was impossible to timber the breastings, and these were opened or widened out to their full width too near the gangway, thereby not reserving sufficient gangway pillar that a crush on the same was unavoidable, but, had they kept adequate chain pillar between the different lifts to cut off or break the superincumbent strata, it is presumed that the cave in would not have extended beyond the inside slope workings, but, as before stated, the necessary support was not reserved to meet such contingency, no one could tell what would be the extent of the cave in. "Whilst others said that they did not expect the crush or fall in to extend further than the workings of the inside slope," but what was to prevent it? when all the breasts had been worked up from one breast to the other, leaving no pillar whatever between the face of the breasts and the gangways, and indeed had it not been for the large pillar reserved in the synclinal in the Ebervale, or the adjoining colliery, it is probable that that mine, too, would have shared the same fate. The night previous to the catastrophe, I gave the mine boss positive orders not to permit any of his employés to work in the slope until the cave in had taken place, and he promised to do so. (See investigation accompanying this report.)

The following day there was no work at this colliery, owing to the crush, as stated by the mine boss at the investigation, and he and his assistant went in No. 3, via No. 1, and requested Harry Hughes to go in after them in course of half an hour. So he went in, and perambulated the mines in search of the mine boss, and accidently came to where the two entombed men were working, and eagerly requested them to come to listen to the mine crushing, as it was about to cave in. But, he said, they merely laughed at him, or something to that effect; and he left again in quest of the mine boss, and found him in No. 3 slope, and told him of these two men being in the mines; and he, with several others, hastened to their res-

cue; but, alas, too late! the cave in had taken place, and Pierson and Murrish inclosed, or, perhaps, instantly killed, by the falling coal and rock.

The cave in happened about twelve o'clock, Tuesday, the 20th day of June, and I was there between three and four, P. M., of the same day, and in company with the mine boss and others, we attempted to get in to where the two men were working by four different routes, but were compelled to retreat each time, owing to the place continually falling, and being hindered by the portion which had fallen in surrounding the men that were in. After trying all available means to extricate them, I concluded to make one final effort on Sunday, the 24th, via Ebervale gangway, and after we advanced through three breasts and pillars, by way of the cross-cuts, we found ourselves cut off, at a point eight hundred feet from where the entombed men were working, by the fallen rock, and the carbonic acid gas which had accumulated, owing to the ventilation being cut off, compelled us to retreat to the surface, intending to sink a shaft from the surface in line with the breast that they were working, a distance of about two hundred and fifty feet; but after measuring the distance from the boundary line to the center of their breast, I observed that the whole surface had set tled down, making it impossible to rescue them alive, supposing them to be at the place of working, which is not probable, as it would take too long a time to drive about eighty yards through rock.

Black Creek.

This creek runs over the coal bed, as can be seen by the cross section; and when the cave in occurred, the creek broke into the mines and filled the lower workings very fast. When the water had raised to the upper gangway, or E on the cross section, the pumps had all they could do to keep it at bay. In course of time the caving in extended towards the slope, that it became necessary to take out the pumps, which was a very hazardous undertaking, for reasons that there was not sufficient slope pillar to prevent the crush from closing it.

A great deal of risk was run to keep those pumps running until adequate pumping capacity could be put in the Ebervale colliery to take all the water that the Harleigh colliery produced. A flume, about eighteen hundred feet long, was built to convey the water over the portion caved in; and in the event of a few days, the crevices in the rocks became filled in with washing, that the creek soon flowed in its regular channel. The depression nearly in the center of the eighteen hundred feet was about seven feet.

SUMMARY.

Coal Production.

Coal shipments,	3,768,530 14
Home consumption, 8 per cent. of shipments,	301,482 41
Total production,	4,070,014 15

	Miners.	Inside.	Outside.	Totals.
Number of miners,	2,499			2,499
Men employed,		2,314	1,716	4,040
Boys employed,		617	2,070	2,687
Aggregate employed,	2,499	2,931	3,786	9,216

Number of persons killed,	26
Number of persons injured,	60
Total number of killed and injured,	86

The following table shows the quantity of coal produced, number of persons employed, and the number of lives lost in the South district of Luzerne and Carbon counties, during 1875, 1876, and 1877; also, the ratio of said production to each person employed; also, to each life lost, and the ratio of persons employed, to each life lost:

	1875.	1876.	1877.	Total.
Coal produced in tons per year,	2,555,888	3,503,118	4,070,014	10,129,020
Number of persons employed,	8,516	9,648	9,216	
Ratio of coal produced to each employé,	300.	363.	442.	Average
Number of lives lost each year,	21	37	26	28
Ratio of coal produced, per life lost,	121,709	94,679	156,539	124,309
Ratio of persons employed, per life lost,	405.4	260.76	354.	340.

The following is the actual shipment of coal from the Lehigh region, as taken from the company's books, during 1875, 1876, 1877:

	Ton of 2,240 lbs.	Average shipment for three years. Tons.
1875,	2,323,535 15	
1876,	3,243,628 15	
1877,	3,070,014 15	2,879,059
Total shipment for three years,	8,637,179 05	

TABLE No. 1.—*List of colliery accidents and loss of life arising therefrom, in the South district of Luzerne and Carbon counties, during the year 1877.*

DATE.	No. of accident.	NAME OF COLLIERY.	NAME OF PERSON KILLED.	OCCUPATION.	Age.	Widows.	Orphans.	NATURE AND CAUSES OF ACCIDENT.	NO. OF PERSONS KILLED. Falls of roof and sides.	By mine cars.	On surface.	Total.
Jan. 14,	1	Upper Lehigh, No. 4,	Gomer Thomas,	Laborer,	15	. .	. .	Killed by a fall of roof,	1			
Jan. 17,	2	Eckley, Council Ridge, No. 5,	Thomas Baskin,	Laborer,	30	1	3	Killed by a piece of coal in face of gangway,	1			
Feb. 19,	3	Sugar loaf, No. 2,	James Stevens,	Driver,	18	. .	. .	Fatally injured, by the car jumping the track,	.	1		
Mar. 16,	4	Summit Hill, No. 9, breaker,	William Hoffman,	Laborer,	33	1	. .	Fatally injured ; run over by transportation cars,	. .	. .	1	
April 4,	5	Cross Creek, Drifton No. 1,	Daniel Gallagher,	Slatepicker,	12	. .	. .	Killed ; crushed by breaker rollers ; fell while playing,	. .	. .	1	
April 24,	6	Cross Creek, Drifton No. 1,	Michael O'Donnell,	Driver,	22	. .	. .	Killed by a fall of coal in the gangway,	1	. .		
May 18,	7	Sugar Loaf, near Hazleton,	Abraham Depue,	Pumpman,	. .	1	6	Killed by riding up the slope on a loaded car,	. .	1		
May 19,	8	Crystal Ridge, near Hazleton,	John Stevenson,	Miner,	50	1	6	Killed by a piece of coal falling on his head,	1			
May 29,	9	Harleigh, No. 3,	Philip Harlan,	Laborer,	25	. .	. .	Killed by a fall of clod or slate,	1			
June 20,	10	Harleigh, No. 3,	Joseph Pearson,	Miners,	38	1	8	Both entombed in the mines by the caving in of the top rock,	1			
June 20,	11	Harleigh, No. 3,	James Murish,		30	. .	. .		1			
July 10,	12	Ebervale, No. 3,	Michael Deitrick,	Breaker boss,	61	. .	. .	Killed ; run over by mine car on the slope,	. .	1		
July 16,	13	Upper Lehigh, No. 2,	Sidney Glace,	Miner,	42	1	4	Killed by a fall of coal ; returned too soon after firing a blast	1			
July 23,	14	Upper Lehigh, No. 2,	William Edwards,	Miner,	23	1	2	Killed by a fall of coal, caused by an unobserved back slip,	1			
Aug. 25,	15	Lattimer, No. 1,	Barney McTaugе,	Miner,	35	1	3	Killed by a fall of coal, 2 foot bench,	1			
Sept. 11,	16	Upper Lehigh, No. 2,	John Quinn,	Miner,	44	1	6	Killed by a fall of coal off the pillar,	1			
Oct. 2,	17	Stockton, No. 2,	Adam Deihl,	Pumpman,	32	1	6	Killed ; run over by mine car on the slope,	. .	1		
Oct. 10,	18	Eckley, Council Ridge, No. 2,	Michael Boyle,	Miner,	35	1	1	Killed by a fall of coal in the breast,	1			
Oct. 23,	19	Craberry, near Hazleton,	Thomas Tilure,	Miner,	40	1	3	Killed by a fall of the dividing slate,	1			
Nov. 6,	20	Nesquehoning, No. 2,	Thomas J. Griffiths,	Driver,	16	. .	. .	Fatally injured ; run over by mine car,	. .	1		
Nov. 10,	21	Summit Hill, No. 9,	Neal Gallagher,	Laborer,	45	1	7	Killed by a fall of coal in the gangway,	1			
Nov. 20,	22	Upper Lehigh, No. 2,	John Lewis, boy,	Slatepicker,	13	. .	. .	Killed by the breaking of the draw bridge pole, while playing at noon hour,	. .	. .	1	
Nov. 26,	23	Stockton, No. 1,	Michael McCann,	Miner,	45	. .	. .	Killed by a fall of coal in his breast,	1			
Aug. 14,	24	Cross Creek, Drifton No. 1,	Hopkin Richards,	Miner,	57	1	1	Injured by a fall of slate ; died in five days afterwards,	1			
Nov. 13,	25	Eckley, Council Ridge, No. 5,	Charles Jones,	Miner,	40	. .	. .	Fatally injured by a fall of slate ; died December 31, 1877,	1			
Dec. 24,	26	Stockton, No. 2,	Daniel Conahan,	Repairsman,	35	1	3	Killed ; run over by mine car on the slope,	. .	1		
		Total,			. .	15	59		17	6	3	26

RECAPITULATION.

	Percentage due to Causes.		No. of Persons Killed.	
	1877.	1876.	1877.	1876.
By explosion of carburretted hydrogen gas,	.....	10,8	.....	4
By falls of roof and sides, *i. e.*, coal, slate, &c.,	65,4	48,6	17	18
By mine cars,	23,	19,	6	7
By blasting powder,	.....	2,7	.....	1
By hoisting machinery,	.....	2,7	.....	1
By sundries above ground,	11,6	8,1	3	3
By sundries under ground,	.....	2,7	.....	1
By falling into slope,	.....	5,4	.....	2
	.....	.....	26	37

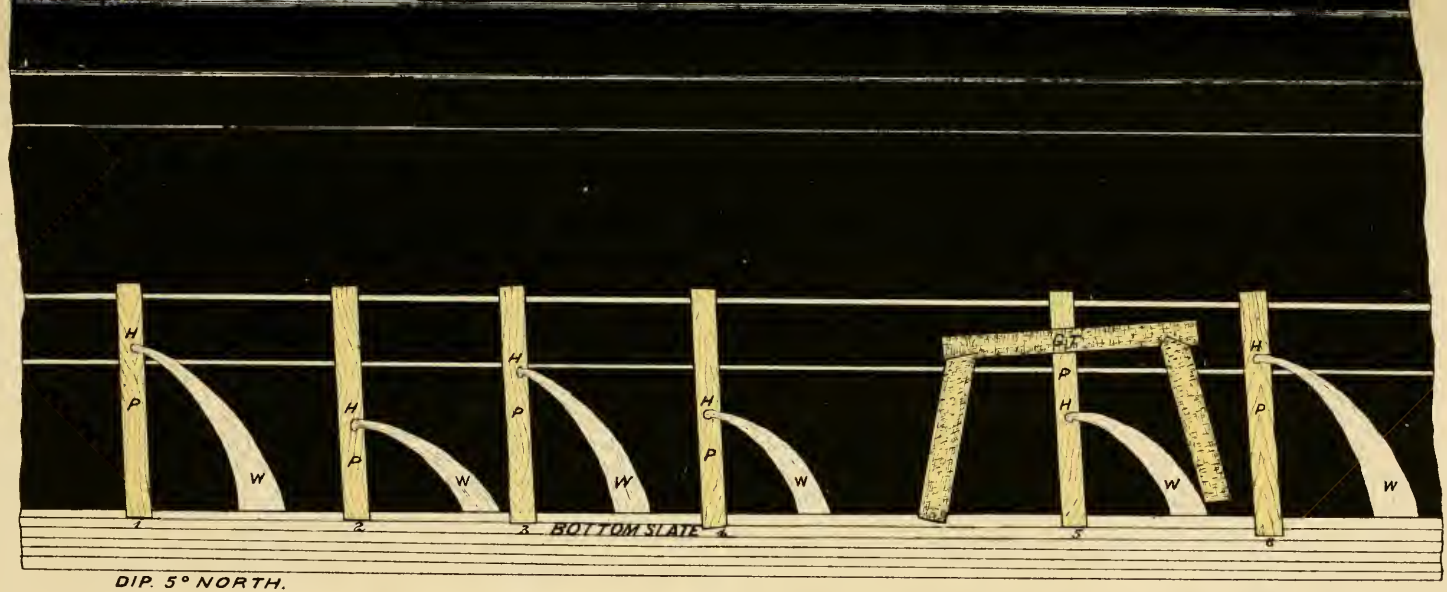
TABLE No. 2.—*Table of accidents not proving fatal in the South district of Luzerne and Carbon counties, during the year ending December 31, 1877.*

DATE.	Number of accidents.	NAME AND LOCATION OF COLLIERY.	NAME OF INJURED.	NATURE AND CAUSES OF ACCIDENT.	NUMBER OF PERSONS INJURED.							
					Explosion of C. H² gas.	Falls of roof.	Falls of coal.	Explosion of blasting powder.	Crushed by mine cars.	Miscellaneous, under ground.	Above ground.	Total.
Jan. 24,	1	Beaver Brook,	Griffith J. Evans,	Thigh broken and leg bruised; by falling under slate car at breaker,							1	1
26,	2	Cross Creek, No. 1,	James O'Donnell,	Hip dislocated; by a piece of coal,			1					1
Feb. 15,	3	Hollywood, No. 2,	John Donlin,	Leg broken; jammed between the mine cars,					1			1
15,	4	Sugar Loaf, No. 2,	Robert Lowden,	Foot severely crushed; by a piece of bottom slate,						1		1
21,	5	Lattimer,	James Larney,	Severely cut in the back; by a piece of coal falling on him,			1					1
26,	6	Beaver Brook,	Michael Carbry,	Leg broken; jammed between the car and the mine door; negligence of the door boy,					1			1
28,	7	Sugar Loaf,	James McCraw,	Severely injured; jammed between the car and prop,					1			1
Mar. 1,	8	Upper Lehigh,	John F. Auben,	Injured on the head and shoulders; by a fall of coal. Not serious,			1					1
5,	9	S. Sugar Loaf,	Edward Graham,	Injured by a fall of coal; by starting the battery,			1					1
9,	10	Summit Hill tunnel, No. 9,	David Richards,	Dangerously injured; by a fall of coal in breast. Hopes of recovery,			1					1
27,	11	Summit Hill, No. 4,	Edward Jones,	Two fingers cut off; by making a wedge,						1		1
28,	12	Woodside, No. 1,	John D. Williams,	Injured; by falling. Report does not state how,						1		1
April 5,	13	Highland, No. 1,	John W. Davis,	Both severely burned; by explosion of carbureted hydrogen gas,	2							2
5,	14	Highland, No. 1,	Evan Richards,									
12,	15	Laurel Hill, No. 2,	August Yeager,	Injured; by a premature blast. Not considered of a serious nature,						1		1
May 11,	16	Highland, No. 2,	John Bray,	Thigh broken; by prying loose coal,			1					1
16,	17	Hazleton mines,	Conrod Shaub,	Leg broken; by prying loose coal,			1					1
	18	Summit Hill, No. 4,	Patrick Manelus,	Both severely burned; by an explosion of carbureted hydrogen gas,	1							1
	19	Summit Hill, No. 4,	Condy Kildea,	Not supposed to be dangerous,	1							1
	20	Summit Hill tunnel, No. 9,	William Richards,	Leg broken and injured otherwise; by falling under the mine cars,					1			1
June 7,	21	Summit Hill tunnel, No. 9,	John Delaney,	Collar bone broken; jammed by mine car,					1			1
20,	22	Summit Hill tunnel, No. 9,	Richard Morgans,	Severely injured on thigh and otherwise; by a fall of slate,						1		1
July 9,	23	East Crystal Ridge,	William Reese,	These three men were severely burned; by an explosion of a keg of powder through the recklessness of Reese,				1				1
9,	24	East Crystal Ridge,	John Roby,					1				1
9,	25	East Crystal Ridge,	Britty Johnson,					1				1
	26	Coleraine,	Mathew Vemp,	Slightly burned; by an explosion of blasting powder, caused from a spark from his lamp,				1				1
25,	27	Stockton, No. 4,	Henry Hanken,	Seriously injured; by a premature blast in rock tunnel,						1		1
27,	28	Summit Hill, No. 4,	Robert Wilson,	Seriously burned; by an explosion of carbureted hydrogen gas,	1							1
Aug. 9,	29	Coleraine, No. 2,	James Hughes,	Arm broken; struck by a piece of coal while riding up the slope,			1					1
9,	30	Cross Creek, No. 1,	John O'Donnell,	Severely injured; by a car running away from one of the breasts,					1			1
10,	31	Humboldt, No. 3,	Edward Moyer,	Injured; jammed by mine cars outside,							1	1
14,	32	Yorktown,	Patrick O'Donnell,	Severely cut about the head and back; by a fall of coal,			1					1
29,	33	Gowen,	Jacob Goho,	Slightly injured on the back; by a fall of coal,			1					1

TABLE No. 2.—*Continued.*

DATE.	Number of accidents.	NAME AND LOCATION OF COLLIERY.	NAME OF INJURED.	NATURE AND CAUSES OF ACCIDENT.	NUMBER OF PERSONS INJURED.							
					Explosion of CH^2 gas.	Falls of roof.	Falls of coal.	Explosion of blasting powder.	Crushed by mine cars.	Miscellaneous, under ground.	Above ground.	Total.
Aug. 31,	34	Oak Dale, No. 1,	Barney Gallagher,	Injured on the back; by fall of coal. Not deemed of a serious nature,	.	.	1	.	.	.	.	1
Sept. 6,	35	Coleraine, No. 2,	Henry Dudly,	Slightly injured; by a fall of coal,	.	.	1	.	.	.	.	1
11,	36	Upper Lehigh,	John Stoker, door boy,	Arm broken, and otherwise injured; by attempting to jump on the cars while in motion,	.	.	.	.	1	.	.	1
12,	37	Beaver Brook,	Henry Heedenright,	Leg broken and cut in the hip; while engaged in standing a prop,	.	.	.	.	.	1	.	1
17,	38	Jeanesville,	Condy Sweeney,	Severely hurt; by falling over the buggy chute,	.	.	.	.	.	1	.	1
22,	39	Gowen,	Jacob Alfertson,	Foot crushed; by a fall of coal in his breast,	.	.	1	.	.	.	.	1
Oct. 5,	40	Lattimer,	Mathew Long,	Brain deranged; struck by his mine drill,	.	.	.	.	.	1	.	1
5,	41	Jeanesville, No. 4,	Alfred Norris,	Leg broken and head cut; jammed by mine cars,	.	.	.	.	1	.	.	1
12,	42	Sandy Run,	David Shoeclin,	Slightly cut on the head; by a piece of coal,	.	.	1	.	.	.	.	1
16,	43	Ebervale,	John Sharp,	Cut in the head and back; by a fall of coal, while loading a car,	.	.	1	.	.	.	.	1
23,	44	Highland,	Mark Wilson,	Hand severely crushed; caught between a lump of coal and the collar, while riding on a car,	.	.	.	.	1	.	.	1
23,	45	Humboldt,	Thomas Smith,	Both burned; by blasting powder. Smith fell, and a spark ignited	.	.	.	1	.	.	.	1
23,	46	Humboldt,	James McCarran,	the loose powder, causing the result,	.	.	.	1	.	.	.	1
27,	47	Buck Mountain,	Charles McElmine,	Shoulder bone fractured; by falling under the mine cars,	.	.	.	.	1	.	.	1
31,	48	Summit Hill tunnel, No. 9,	Thomas Sweeney,	Leg broken and arm cut; jammed by mine cars. His light went out.	.	.	.	.	1	.	.	1
31,	49	Nesquehoning, No. 3,	Thomas Callan,	Both slightly burned, but dangerously injured; by an explosion of carbureted hydrogen gas. Callan was the fire-boss, and took Mc-	1	.	.	.	.	.	.	1
31,	50	Nesquehoning, No. 3,	John McArdle,	Ardle with him to open a cross-cut which had closed, and ascended the breast with a naked light, "because there was no gas there the day previous;" hence the explosion, precipitating them down the manway,	1	.	.	.	.	.	.	1
Nov. 24,	51	Jeanesville, No. 5,	John McGee,	Severely hurt; by a fall of clod or slate,	.	1	.	.	.	.	.	1
28,	52	Humboldt, No. 3,	Thomas Thompson,	Severely crushed; by mine car jumping the track,	.	.	.	.	1	.	.	1
Dec. 3,	53	Council Ridge,	George Anthony,	Leg broken; by a piece of coal rolling down the breast,	.	.	1	.	.	.	.	1
3,	54	Highland, No. 2,	Henry Grote,	Injured; by a fall of coal in his breast,	.	.	1	.	.	.	.	1
5,	55	Jeanesville, No. —,	Patrick McGarvey,	Seriously hurt on the head, and otherwise injured; by a fall of slate,	.	1	.	.	.	.	.	1
6,	56	Millensville, No. 7,	John Martin,	Flesh wound on thigh, implicating the large artery; by a fall of coal,	.	.	1	.	.	.	.	1
5,	57	Mount Pleasant,	Dangherty Faragel,	Supposed to have both legs broken; by the car jumping the track,	.	.	.	.	1	.	.	1
6,	58	Ebervale, No. 2,	Neal McMunigal,	Dangerously hurt; run over by mine cars when on his way home,	.	.	.	.	1	.	.	1
13,	59	Summit Hill, No. 4,	Peter Doran,	Severely burned; by an explosion of carbureted hydrogen gas.	1	.	.	.	.	.	.	1
13,	60	Summit Hill, No. 4,	Edward Stewart,	Not considered dangerous,	1	.	.	.	.	.	.	1
					9	2	18	6	14	9	2	60

MAMMOTH SEAM



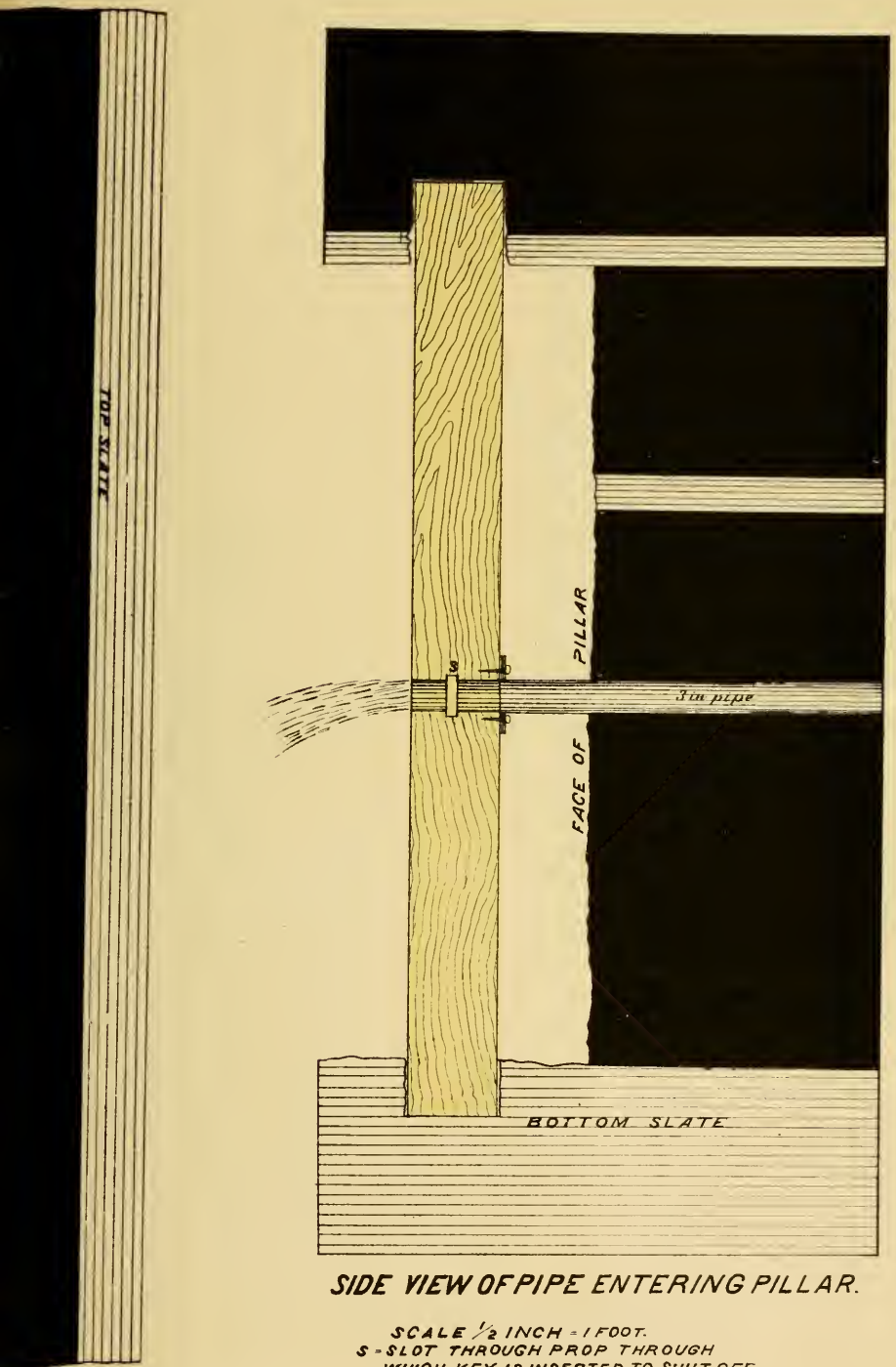
SECTION OF LINE OF BORE HOLES THROUGH BARRIER PILLAR BETWEEN HARLEIGH AND EBERVALE FOR THE PURPOSE OF TAKING HARLEIGH MINE WATER AS THE PILLAR WAS NOT DEEMED STRONG ENOUGH OWING TO THE CRUSH OR CAVE IN

SCALE ⅛ OF AN INCH = 1 FOOT.

REFERENCE.

P = PROP 12"X12"
W = WATER.
GT = GANGWAY TIMBERS
H = BORE HOLES 3 IN. IN DIAMETER
FOR FURTHER REFERENCE SEE NEXT PAGE. TABLE NO 3

BY T. D. JONES.
INSPECTOR OF MINES.



SIDE VIEW OF PIPE ENTERING PILLAR.

SCALE ½ INCH = 1 FOOT.
S = SLOT THROUGH PROP THROUGH
WHICH KEY IS INSERTED TO SHUT OFF
THE WATER.

TABLE No. 3—*Exhibiting the dimensions of the bore holes through the barrier pillar between Harleigh and Ebervale collieries, and the quantity of water issuing through each hole at one time.*

Hole No.	Diameter of hole.	Reach of jet from mouth of hole.	Height of hole from bottom slate.	Length of hole through pillars.	Height of water in the adjoining collieries.	Pressure indicated by the gauge on the holes.	Bench of coal in which hole is bored.	Dimensions of Props. Length.	Dimensions of Props. Thickness.	Dimensions of Key. In slot of prop.	No. of gallons discharged a minute.	Remarks.
	Inches.	Feet.	Feet.	Feet.	Feet.	Pounds	Feet.	Feet.	Inches.	Inches.		
1, . .	2	4	6.	45	27	11¾	2	10	12x12	1¼x5½x15	118.4	Easy boring; coal shattered.
2, . .	3	5¼	3.8	30	32	13¾	4	10	12x12	1¼x5½x15	354.9	Hard boring.
3, . .	3	3¾	5.	57	30	13	4	10	12x12	1¼x5½x15	305.3	Hard boring.
4, . .	3	3¾	3.3	45	31	13¼	4	10	12x12	1¼x5½x15	349.3	Hard boring.
5, . .	3	5¼	4.3	39	35	15¼	4	10	12x12	1¼x5½x15	398.7	Hard boring in face of gangway.
6, . .	3	5¼	6.8	57	33	14¼	2	10	12x12	1¼x5½x15	320.2	Hard boring; coal shattered at mouth of hole.
											1846.8	Total issuing through the 6 holes.

The following formula has been employed to ascertain the quantity of water issuing through each bore hole, in which friction is taken into account:

$G=\sqrt{\frac{(3d)^5\times H}{L}}$, in which G=the discharge in gallons a minute, H=head of water in feet, L=length of bore hole in *yards*, and d=diameter of hole in inches.

Thus, let it be required to find the discharge of hole No. 5, which is 3 inches in diameter, 13 yards long, under a head of 35 feet.

Hole No. 5, $G=\sqrt{\frac{(9)^5\times 35'}{13\text{ yds.}}}=5\times\frac{\log 9+\log 35-\log 13}{2}=398.7$ gallons.

Temperature of water, 54°; temperature in the gangway, 58°; temperature on surface, 58°. The section of the line of bore holes was put through the pillar to tap the water in the Harleigh mines, which had raised at the time to 45 feet. Previous to doing so, careful observations of the indications of the water oozing through the pillar had been made, and as the same increased daily, I concluded to request the company to put in sufficient pumping capacity, and take the water produced by the adjoining colliery by means of the bore holes through the pillar, as indicated on the section, as I did not consider the barrier pillar strong enough to resist 320 feet head of water. This, of course, was alarming news to the company, as they did not anticipate that the caving in of the Harleigh colliery was of so damaging a character to their mines. At my request, Mr. Van Winckle, president of the company, invited Messrs. C. Pardee, E. B. Coxe, T. S. McNair to go in the mines, in company with their superintendent, Mr. T. P. McFarlane, and himself, and get their opinion as to the strength of the pillar. Accordingly this was accepted, and the party proceeded to the scene, and, after the neeessary inspection, they, too, gave it as their opinion that it was the only remedy to put in adequate pumping capacity and take all the water. Since, three large pumps have been put in, an account of which can be seen in another part of this report. Since the water has been tapped by the bore holes, the water has lowered 20 feet in the adjoining mines. Before standing the props, a hole, about 5 feet long, was drilled into the pillar, and a gas tube or pipe, 6 feet long, with a flange on the outer end, inserted into the hole, after which the prop was stood, and the flange of the pipe spiked against the inside of the prop. Then the drilling with the long drill was commenced, and continued at the rate of about 15 feet per hour, by three men, a distance of 45 feet, at which point they struck water, proving the pillar to be exactly the same as represented by the maps of these collieries. This is complimentary to Mr. Thomas S. McNair, C. and M. E., for the accuracy of his surveys.

A slot $1\frac{1}{4}''\text{x}5\frac{1}{2}''$ was morticed through the side of the props to shut off the water with a key, in case anything should happen to the pumps.

TABLE No. 4—*Showing the absolute capacity and actual duty of the new steam pumps put in the Ebervale collieries, necessitated by the caving in of the Harleigh mines; also, of the old pumps that were previously in use.*

Slope No.	Pump No.	Diameter of—					Length of steam pipes from boilers to pumps.	Vertical height from—		Number of angles of—		Pressure per square inch on—		Length of stroke of pump.	Absolute number of revolutions of—		Actual working speed in revolution per minute.		Pressure per square inch on steam cylinder at—		Foot pounds of water at—	
		Steam pipe.	Steam cylinder.	Water cylinder.	Suction pipe.	Column pipe.		Suction pipe to pump.	Pump to discharge.	Steam pipes.	Column pipes.	Boilers.	Water cylinder.		One engine.	Both engines.	One engine.	Both engines.	Absolute revolutions.	Actual working speed.	Absolute revolutions per minute.	Actual working speed and revolutions per minute.
		In.	In.	In.	In.	In.	Feet.	Feet.	Feet.					In.								
1, ...	1	4	28	12	16	12	945	17	208	4	2	58	*102	48	15	30	10	20	28	25	2,768,443.2	1,845,628.8
1, ...	2	4	30	14	14	12	895	17	208	4	2	58	*102	72	$6\frac{1}{2}$	. . . .	4	. . . .	30	30	1,224,667.	753,641.28
1, ...	3	4	$31\frac{1}{2}$	15	16	14	$458\frac{1}{2}$	6	216	5	2	58	*97	48	15	30	$11\frac{1}{4}$	$22\frac{1}{2}$	35	28	4,113,808.8	3,085,356.6
2, ...	4	4	$31\frac{1}{2}$	14	16	14	804	12	350	3	1	75	152	48	5	10	5	10				
2, ...	5	2	20	14	12	10	928	17	74	2	2	75	32	36	30	. . . .	16					
1, ...	6	3	20	8	8	6	895	17	208	4	1	65	90	36	20	. . . .	20					
1, ...	7	4	14	14	12	12	. . . .	6	216	2	1	65	93	72	5	. . . .	5					
3, ...	8	4	28	10	12	10	1,010	15	219	5	3	75	95	48	20	40	10	20				

TABLE No. 4—Continued.

Slope No.	Indicated horse power applied at—		Useful effect in horse power at—		Percentage of useful effect of the power spent.		Absolute number of gallons of water capable of pumping per—				Actual number of gallons pumped per—		Steam boilers.			Remarks.
	Absolute number of revolutions of both engines.	Actual working speed of both engines.	Absolute number of revolutions of both engines.	Actual working speed of both engines.	Absolute number of revolutions of both engines.	Actual working speed of both engines.	Single stroke.	Revolutions of one engine.	Minute for both engines.	Twenty-four hours for both engines.	Minute for both engines.	Twenty-four hours for both engines.	Number of.	Diameter.	Length.	
														In.	Ft.	
1, . . .	125.38	74.64	83.89	55.93	66.90	74.93	23.5	47.	1,410.	2,030,400	940.	1,353,600.	26	33	22	Salkeld's duplex eccentric motion, built at Mauch Chunk.
1, . . .	50.12	30.84	37.11	22.84	74.04	74.05	47.99	95.98	1,247.7	1,796,688	767.84	1,105,689.6	. .	. . .	. .	Allison's double acting, built at Jeanesville.
1, . . .	198.36	119.02	124.66	93.50	62.8	78.56	36.77	73.54	2,206.2	3,176,928	6,654.65	2,382,696.	. .	. . .	. .	Clark's duplex eccentric motion, built at Hazleton.
2, . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	31.99	63.98	639.8	921,312	639.8	921,312.	20	34	22	Clark's duplex eccentric motion.
2, . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	23.99	47.98	1,439.4	2,073,736	767.68	1,105,459.2	. .	. . .	. .	Cameron's double acting.
1, . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	7.83	15.66	313.2	451,008	313.2	451,008.	. .	. . .	. .	Cameron's double acting, extra.
1, . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	47.99	95.98	479.9	691,056	479.9	691,056.	. .	. . .	. .	Piston pump, double acting.
3, . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	16.32	32.64	1,305.6	1,880,064	652.8	940,032.	15	34	22	Clark's duplex eccentric motion.
							236.38	472.76	9,041.8	13,021,192	6,215.87	8,950,852.8	61			

Explanations.

* Marked thus is the pressure as indicated by the gauge on the water cylinder while the pump was running. The other pressure in the same column is the hydrostatic pressure. The pumping capacity to the surface previous to putting in pumps, Nos. 1, 2, and 3, was 1,119 gallons per minute. Since the caving in of the adjoining colliery it has increased to 2,206 gallons per minute, exclusive of the pumps that were in, or about double. The increased quantity of water issuing through the barrier pillar is found to be about 1,846.8 gallons per minute, or about 715 gallons per minute more than the capacity of the old pumps that were in slope Nos. 1 and 2.

Length of slope, No. 1, to first lift, 333 feet; to second lift, 679 feet; to third lift, 820 feet. Length of slope, No. 2, to second lift, 679 feet; to third lift, 853½ feet. Distance from bottom of slope to Clark pump, 50 feet. Distance from No. 1 boilers to mouth of slope, 75 feet. Distance from No. 2 boilers to mouth of slope, 75 feet. Distance from Allison pump to Salkeld's, 50 feet. Diameter of steam pipe is 6″ for a distance of 450 feet from the boilers, and 5″ for 150 feet; the remaining distance of 295 feet is 4″ diameter to the pumps. Pumps Nos. 6 and 7 are only used in case of heavy water. At the bottom of slope No. 2, a 2½″ steam pipe connects with a 4″, to convey steam to the Cameron's, a lift of 74 feet below the duplex pump. Pump Nos. 1 and 2 pumps the water up to pump No. 3, (208 feet, vertical,) indicate an excess capacity of 55 per cent., and pump No. 3 shows a surplus capacity of 33 per cent., independent of the old pumps, and pumps to the surface. Pump No. 5 pumps from third lift, in slope No. 2, to pump No. 4, and pump No. 4 pumps to the surface, 350 feet vertical. Pump No. 6 is located between pump Nos. 1 and 2, and is only used in case of necessity. Pump No. 7 assists pump No. 3 when needed. The steam pipes are covered by placing laths on the pipes, ¾ of an inch square and 3″ apart, full length of the pipe, and are then tied on with wire wound around the laths and pipe, after which a straw rope, 1½″ diameter, is wound around the laths, leaving an air space of ¾″ between the pipe and the covering; then a mixture of coarse sand, some lime, and cut straw is put on, for a coating, making a covering of 3½ inches, exclusive of the laths. This is considered by many of the superintendents here to be nearly equal to the material put on by the patentees, and costing a great deal less. I am unable to give the proportion of the admixture, as they did not keep an account of the amount of the ingredients composing the coating or covering. The percentage of useful effect, as is given in this table, is, indeed, very high, as the work done by the power spent seldom exceeds 50 per cent. The pumps all exhaust into the suction, or tail pipe, and operate very satisfactorily. The intention of this table, in the first place, was to show the increase quantity of water caused by the caving in of the adjoining colliery, or in not reserving sufficient barrier pillar to resist 320 feet head of water; and, as the mining law does not specify how near the different parties can work to the same, I did not

consider it my duty to interfere, although I am of the opinion that there ought to be a limit, and each mine owner should be restricted from working beyond said limit, say 15 yards from the boundary line, or reserving as much pillar each side of the line as would be required. By doing so, a great deal of trouble might be obviated, and the unnecsssary expenditures of thousands of dollars saved.

Table No. 5, *Giving the production of coal from the different seams in the Lehigh region, and the consumption of powder in mining the same.*

NAME OF COAL SEAM.	COAL SENT TO MARKET. Tons, 2,240 lbs.	COAL PRODUCTION. Tons, 2,240 lbs.	POWDER CONSUMED. Kegs of 25 lbs.	TONS COAL MINED. Per keg powder used.	TONS COAL MINED. Per lbs powder used.	Powder used to each ton in lbs.	Percentage of different coals marketed.	LEHIGH REGION, AVERAGE THICKNESS OF COAL SEAMS. Thickness in feet.	LEHIGH REGION, AVERAGE THICKNESS OF COAL SEAMS. Inclination from.
Mammoth or E,	2,251,262.17	2,431,364	31,753	76.57	3.06	.3268	59.75	†28	
Wharton or D,	451,660.	487,793	9,809	49.73	1.99	.5030	11.98	*60 8	Horizon to 80°
Buck Mountain or B,	1,065,607.17	1,150,857	22,718½	50.66	2.02	.4950	28.27	12	Horizon to 80° Horizon to 80°
Totals and averages,	3,768,530.14	4,070,014	64,280½	58.78	2.35	.4412	100.00		

Eight per cent. has been added to the coal shipped (for home consumption) to equal the coal production.

Number of tons of powder consumed, 803½.

Ratio of coal production in tons to each ton of powder consumed, 5,065.35.

* The Mammoth seam will average 60 feet thick in Panther Creek Valley.

† The Mammoth seam at Hazleton and vicinity will average 28 feet thick.

Average number of days for each breaker to work, 187.2.

Average shipments of coal from each breaker per day, 450 tons.

Number of breakers or collieries in the district, 52.

Number of breakers or collieries in operation in 1877, 47.

Therefore, the approximate capacity of shipment, of all the collieries, would be as follows: 450 tons×313 days×52 breakers=7,324,200 tons.

Average powder used in pounds to each ton of coal: .44×450 tons÷25 (pounds to the keg,)=7.92 kegs to mine 450 tons of coal.

Blasting mining powder.—There are three manufacturers of powder in this particular and important branch of business, viz: Laflin & Rand, General Oliver, and Du Pont, each of these claiming a superiority of their product over the other. It is true that we are indebted to General Oliver for cheapness of mining powder in this region, for I do know, that previous to his powder being introduced into this district, the miners had to pay about $4 00 per keg, while it is now selling for about $2 25 per keg. The average amount of powder used by each miner in this district, will amount to 25.69 kegs of 25 pounds each, for the time worked last year; this is a very important item in the cost of mining, especially in the Wharton vein where the coal is very hard and the seam contracted. There are diversities of opinion as to the best of these powders for mining purposes, and I find a great deal of prejudice existing among the miners regarding it. The superintendents at many of the collieries are anxious to furnish the miners with such powder as they have preference for, and in many instances I have known them to keep several kinds on hand to satisfy their men, which is certainly right and just. It has been intimated by some parties in charge, that the inspector has found fault with a certain kind of powder, "hence they can't buy such and such powder." This cannot be substantiated, as I have not mentioned anything relative to powder, unless it was concerning the powder smoke which at times had accumulated at the face of the workings. This, of course, I considered my imperative duty to complain of, owing to insufficient ventilation to carry off the smoke. I will guaranty those gentlemen, that I shall not interfere as long as I find that any of these powders are not unusually deteriorating to the "health and safety of persons employed in coal mines," but will insist on ample ventilation being conducted to the face of each working place. I am of the opinion that the above is a subterfuge to delude the manufacturers, and, possibly, with a view of buying cheaper from some one else.

I am not aware that there exists any reasons for complaint as to powder smoke lingering at the face of the workings, except at one colliery, and as there is no immediate danger to life, I deferred applying to the court for an injunction, the superintendent promising to comply with my request. Whereby this can be amicably and satisfactorily accomplished, it is best to do so, rather than to resort to severe measures.

TABLE No. 6—*Shows the number of slopes, and coal breakers, and the number of days operated, classes, and the whole number of employees; also, the total tonnage of coal shipped to market, and the average number of tons shipped per employee, per miner; also, for each colliery per day in 1877.*

Name of Colliery.	Number of				Number of underground workmen.					Number of surface workmen.				Total number of employees.	Total shipment of coal to market. (tons of two thousand two hundred and forty pounds.)	No. of tons of coal shipped to each			Number of		
	Slopes.	Tunnels and drifts.	Breakers, or collieries.	Days worked.	Miners.	Laborers.	Bosses and comp'y men.	Boys.	Total underground.	Mechanics.	Bosses and comp'y men.	Boys.	Total on surface.			Employee.	Miner.	Colliery per day.	Kegs of powder used.	Tons of coal shipped per kegs of powder used.	Mules.
Upper Lehigh colliery, No. 1,	2	. . .	1	221¼	34	36	9	10	89	6	44	27	77	166	108,840.01	655.66	3,201.18	490.82	2,672	40.73	15
Upper Lehigh colliery, No. 2,	2	. . .	1	237½	72	41	27	16	156	8	47	42	97	253	158,148.01	625.09	2,196.50	666.58	2,902	54.49	48
Woodside colliery,	1	. . .	1	252⅝	30	12	51	5	98	6	21	13	40	138	52,403.07	379.73	1,746.76	207.53	1,214½	43.14	9
Cross Creek colliery, No. 1,	1	. . .	1	289	120	70	64	16	270	24	62	35	121	391	226,851.06	580.18	1,890.42	784.95	4,656	48.72	37
Cross Creek colliery, No. 2,*	1	. . .	1	. . .	29	41	1	2	73	4	. . .	. . .	4	77							
Oak Dale colliery, No. 1,	1	. . .	1	233	82	8	7	16	113	4	12	49	65	178	113,822.02	639.45	1,388.07	488.51	1,572	72.13	28
Oak Dale colliery, No. 2,	1	. . .	1	227	88	6	3	20	117	4	19	38	61	178	108,970.04	621.19	1,238.29	480.04	1,921	56.72	34
Highland colliery, No. 1,	1	. . .	1	207	90	10	3	20	123	4	14	29	47	170	92,909.16	546.52	1,032.32	448.83	1,397	66.51	27
Highland colliery, No. 2,	1	. . .	1	144	50	4	1	4	59	5	18	41	64	123	68,244.15	554.82	1,364.88	473.92	1,420	48.06	13
Sandy Run colliery,	1	. . .	1	109	32	32	8	6	78	4	31	22	57	135	32,070.11	237.55	1,002.19	294.22	735	43.63	7
Buck Mountain colliery,	3	. . .	1	178⅜	128	35	32	37	232	24	67	33	124	356	144,803.	466.75	1,131.27	810.08	3,693	39.21	68
Council Ridge colliery, No. 2,	1	. . .	1	194	75	46	10	20	151	6	14	52	72	223	87,248.04	391.24	1,163.30	449.73	2,087	41.8	37
Council Ridge colliery, No. 5,	1	. . .	1	206	65	25	11	6	107	1	7	42	50	157	81,140.16	516.81	1,248.31	393.88	1,619	50.12	9
Ebervale colliery, No. 2,	2	. . .	1	202	170	31	44	38	283	17	111	69	197	480	226,349.04	471.56	1,331.46	561.66	4,532	49.94	55
Ebervale colliery, No. 3,	1	. . .	1	201	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	561.66			
Harleigh colliery, No. 1,	1	. . .	1	121⅛	24	36	7	11	78	4	21	37	62	140	76,116.14	215.62	1,072 05	434.33	735	66.82	18
Harleigh colliery, No. 3,	1	. . .	1	53⅜	47	62	12	17	138	5	13	57	75	213	. . . . .	. . . .	. . . . .	. . . .	404	. . . .	19
Lattimer colliery, No. 1,	1	. .	1	199	41	13	9	7	70	4	16	62	82	152	111,294.12	732.19	2,714.49	559.26	1,335	83.36	17
Lattimer colliery, No. 2,	1	. .	1	193	41	8	14	8	71	3	18	67	88	159	91,896.05	777.96	2,241.36	476.14	1,335	68.84	16
Milnesville colliery, No. 6,	1	. . .	1	81	3	20	7	1	31	2	20	21	43	74	8,000.	108.11	2,666.67	98.76	120	66.66	6
Milnesville colliery, No. 7,	1	. . .	1	226	53	33	6	10	102	4	38	35	77	179	106,644.16	595.84	2,012.15	471.87	880	121.18	19
Hollywood colliery,	2	. . .	1	197	32	18	6	5	61	8	28	47	83	144	72,057.	500.40	2,251.80	365.77	1,205	59.79	16
East Sugar Loaf colliery, No. 2,	1	. . .	1	188	26	19	19	8	72	4	17	22	43	115	37,592.	326.88	1,445.85	199.95	174	216.05	8
East Sugar Loaf colliery, No. 5,	2	. . .	1	240	61	65	21	19	166	8	33	43	84	250	114,450.	457.80	1,876.23	476.87	1,853	61.76	34
East Sugar Loaf colliery, No. 7,	1	. . .	1	229	57	29	10	12	108	6	28	28	62	170	86,600.	509.41	1,519.29	378.16	1,420	60.98	17
South Sugar Loaf colliery,	1	. . .	1	151	34	17	5	9	65	7	32	31	70	135	. . . . .	. . . .	. . . . .	. . . .	880	. . . .	15
Sugar Loaf colliery,	2	. . .	1	175	61	. . .	9	7	77	5	29	42	76	153	72,452.03	251.57	762.65	222.24	695	47.50	16
Laurel Hill colliery,	1	. . .	1	186	73	29	11	20	133	13	45	89	147	280	. . . . .	. . . .	. . . . .	. . . .	1,430	. . . .	50

TABLE No. 6—Continued.

NAME OF COLLIERY.	NUMBER OF				NUMBER OF UNDERGROUND WORKMEN.					NUMBER OF SURFACE WORKMEN.				Total number of employees.	Total shipment of coal to market, (tons of two thousand two hundred and forty pounds.)	NO. OF TONS OF COAL SHIPPED TO EACH			NUMBER OF		
	Slopes.	Tunnels and drifts.	Breakers, or collieries.	Days worked.	Miners.	Laborers.	Bosses and comp'y men.	Boys.	Total underground.	Mechanics.	Bosses and comp'y men.	Boys.	Total on surface.			Employee.	Miner.	Colliery per day.	Kegs of powder used.	Tons of coal shipped per kegs of powder used.	Mules.
Hazleton colliery, No. 3,*	1	. . .	1	. . . .	9	9	6	2	26	4	15	1	20	46	. . . . .	. . . .	. . . . .	. . . .	55	. . . .	6
Hazleton colliery, No. 1,	1	. . .	1	181¼	50	29	4	10	93	5	21	55	81	174	237,524.08	523.18	1,931 06	646.76	940	100.22	22
East Crystal Ridge colliery,	1	. . .	1	154⅜	53	5	4	6	68	6	15	34	55	123	. . . . .	. . . .	. . . . .	. . . .	980	. . . .	14
Craberry colliery,	1	. . .	1	164½	55	27	5	8	95	7	28	48	83	178	132,143.04	439.01	1,223.54	413.59	1,400	55.52	23
Mount Pleasant colliery,	1	. . .	1	154½	45	28	13	11	97	7	22	30	59	156	56,909.01	364.80	1,264 64	368.34	1,217	46.76	22
Humboldt colliery,	1	. . .	1	170¼	38	9	5	8	60	6	18	38	62	122	51,859.	425.07	1,364 71	304.60	930	55.76	14
West Lehigh colliery,	. .	D 2	1	120½	28	27	6	3	64	2	10	12	24	88	11,070.	125.80	395 35	91.86	288	38.44	6
Stanton colliery,	. .	D 2	chute.	120	3	3	1	. .	7	. .	5	5	10	17	1,878.	110.47	626 00	15.65	35	53.65	3
Coleraine colliery, No. 1,	1	. . .	1	226	35	45	5	8	93	4	17	48	69	162	100,000.	617.28	2,857.11	442.47	1,619	61.76	11
Coleraine colliery, No. 2,	2	. . .	1	233	35	25	5	10	75	6	20	44	70	145	58,761.	405.24	1,678.88	252.19	1,126	52.18	14
Spring Mountain colliery, No. 1,*	1	. . .	1	. . . .	. . .	3	. . .	. .	3	4	9	1	14	17	. . . . .	. . . .	. . . . .	. . . .	25	. . .	6
Spring Mountain colliery, No. 4,	1	. . .	1	166	32	41	3	14	90	5	16	66	87	177	74,207.	419.24	2,318.97	447.03	1,100	67.46	14
Spring Mountain colliery, No. 5,	2	D 1	1	168	55	62	3	18	138	6	24	63	93	231	111,313.	481.87	2,023.87	662.57	2,000	55.65	28
Beaver Brook colliery, No. 1,	1	. . .	1	187¼	24	23	4	7	58	6	17	31	54	112	51,166.	456.84	2,131.92	273.25	3,140	36.20	14
Beaver Brook colliery, No. 2,	1	. . .	1	207⅝	40	36	12	12	100	6	13	23	42	142	62,540.	440.42	1,563.50	301.39	. . .	. . .	21
Spring Brook colliery, No. 5,	1	. . .	1	135¾	94	98	57	24	273	6	47	74	127	400	114,314.06	285.78	1,216.10	842.09	2,327	49.12	33
Spring Brook colliery, No. 6,	1	. . .	1																		
Treseckow colliery,	2	. . .	1	125	105	48	35	24	212	15	39	65	119	331	72,028.13	217.61	685.98	576.22	1,715	41.99	37
Room Run colliery, No. 3,	2	T S 2	1	193¼	63	65	23	29	180	23	63	76	162	342	90,293.04	264.01	1,433.22	476.23	687	131.42	48
Panther Creek colliery, No. 4,	1	. . .	1	147	29	20	125	36	210	8	76	71	155	365	79,706.10	218.37	2,748.48	542.22	300	265.68	32
Panther Creek colliery, No. 5,*	1	T 1	1																		
Panther Creek colliery, No. 6,	. .	T 3	1	179¾	17	13	40	7	77	4	54	76	134	211	75,058 15	355.72	4,415.18	417.57	360	208.49	24
Panther Creek colliery, No. 9,	1	T 1	2	199¼	48	37	121	23	229	6	50	132	188	417	107,367.16	257.47	2,236.82	538.85	1,200	89.47	60
Kocher's Notch, (sinking slope,)	1																				
Stafford colliery, (idle,)*	2	. . .	1																		
Old Tunnel, (local trade,)	. .	. . .	. . . .	. . . .	3	1	. . .	. .	4	. .	3	4	7	11	1,486.	135.09	495.33	. . . .	. . . .	. . . .	3
Mountain Tunnels, (Lanford's,)	. .	. . .	. . . .	. . . .	20	28	3	7	58	2	. . . .	. . .	2	60	. . . . .	. . . .	. . . . .	. . . .	. . . .	. . .	14
Total,	65	12	52	8,376¼	2,499	1,428	886	617	5,430	328	1,388	2,070	3,786	9,216	3,768,530.14	. . . .	. . . . .	. . . .	64,280⅝	. . . .	1,107
Averages,	. .	. . .	. . . .	172.2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	‡80,181.5	416.77	1,693 05	450.	†7,6742	58.62	23.

* Marked thus, no shipments. Number of collieries in operation during the year, 47, *i. e.*, shipping coal. T—Tunnels. D—Drifts. S—Shafts.

Number of slopes in operation,	65
Number of tunnels in operation, (surface openings,)	6
Number of drifts in operation,	5
Number of shafts in operation,	1
Total,	77

† Per day for each colliery. ‡ Per year for each colliery.

TABLE No. 7.—*Report of the condition of steam boilers, and steam engines, in the South district of Luzerne and Carbon counties, for 1877.*

Number of slopes.	Name of Collieries.	Slope number.	Number of boilers.	Dimensions. Length in feet.	Dimensions. Diameter in inches.	Pressure per square inch in pounds.	Kind of Steam Gauge used.	Date of Last Boiler Examination.	Present condition, i. e., safe or unsafe.	Number and Horse-power of Engines. No. of hoisting engines.	Horse-power of same.	No. of breaker engines.	Horse-power of same.	No. of pumping engines.	Horse-power of same.	No. of fan engines.	Horse-power of same.	Total number of engines.	Total horse-power.	No. of locomotives under ground.	No. of mine locomotives above ground.
1	Upper Lehigh,	1	8	35	34	75	Belfield,	December 8, 1877,	Safe,	3	144	1	60	3	234	1	25	8	463		
2	Upper Lehigh,	2	16	26	34	75	Allen spring,	December 8, 1877,	Safe.												
3	Upper Lehigh,	3	6	36	34	75	Belfield,	December 9, 1877,	Safe,	3	175	1	60	2	150	1	40	7	425		1
4	Upper Lehigh,	4	12	36	34	75	Belfield,	December 16, 1877,	Safe.												
	Upper Lehigh saw-mill,		2	36	34	75	Belfield,	December 7, 1877,	Safe.												
	Upper Lehigh water-works		2	26	34	65	Both,	December 7, 1877,	Safe.												
	Upper Lehigh locomotive,		1	9	28	90	Belfield,	December 2, 1877,	Safe.												
5	Woodside,	1	6	22	34	70	Ashcroft,	September 29, 1877,	Safe,	1	40	1	20	2	300			4	360		
	Woodside locomotive boiler		1			60	Snyder,	October 13, 1877,	Safe.												
	Woodside water-works,		1	22	34	50	Snyder,	December 5, 1877,	Safe.												
	Woodside upright tub. boiler	4	1			70	Snyder,	December 3, 1877,	Safe.												
6	Cross Creek,	1	18	36	34	70	Snyder,	December 20, 1877,	Safe,	3	160	1	30	2	350	2	80	8	620	1	
7	Cross Creek,	2	18	36	34	70	Ashcroft,	December 1 to 29, 1877,	Safe,	4	180	1	30	1	200	1	40	7	450	2	
8	Oak Dale,	1	12	22	33	65	Ashcroft,	December 1 to 29, 1877,	Safe,	2	80	1	30					3	110		
9	Oak Dale,	2	15	22	33	65	Ashcroft,	December 1 to 29, 1877,	Safe,	2	80	1	30					3	110		
10	Highland,	1	12	22	33	65	Ashcroft,	December 1 to 29, 1877,	Safe,	2	80	1	30			1	30	4	140		
11	Highland,	2	12	22	33	65	Allen,	December 1 to 29, 1877,	Safe,	2	80	1	30					3	110		
	Oak Dale tubular,	2	4	17	51	75	Ashcroft,	December 1 to 29, 1877,	Safe.												
	Oak Dale,		6	22	33	70	Ashcroft,	December 1 to 29, 1877,	Safe.												
12	Sandy Run,	1	8	36	34	75	Schmedt & Bro.,	January 7 and 10, 1877,	Safe,	4	495	1	60	3	110	1	35	9	700		
13	Buck Mountain,	2	20	26	34 / 30	70	Belfield,	Dec. 29, January 1, 1877,	Safe,	9	390	1	60	1	40	1	35	12	525		
14	Buck Mountain,	3	7	30	30 / 34	70	Belfield,	December 8 and 29, 1877,	Safe.												
15	Buck Mountain,	4	8	30	30 / 34	70	Belfield,	Dec. 24, '77, to Jan. 1, '78,	Safe.												
16	Buck Mountain,	5	1	17	30	60	Belfield,	December 17, 1877,	Safe.												
17	Buck Mountain,	6	3	31	34	65	Belfield,	December 8, 1877,	Safe.												
	Buck Mount'n hoist'g plane		3	14 / 40	30 / 36	80	Belfield,	December 29, 1877,	Safe.												
	Buck Mount'n hoist'g plane		2	40	36	80	Belfield,	December 26, 1877,	Safe.												
	Buck Mountain breaker,		3	25	30	65	Belfield,	December 8, 1877,	Safe.												
	Buck Mount'n slope, sink'g		1	30	30	60	Belfield,	December 30, 1877,	Safe.												
	Buck Mount'n sand spring,		2	30 / 15½	30	70 / 60	Belfield,	December 10, 1877,	Safe.												
18	Council Ridge,	2	16	26	34	70	Belfield,	December, 1877,	Safe,	4	180	1	40	2	120	1	35	8	375		

19	Council Ridge, inside,	2	6	26	32	65	Ashcroft,	December, 1877,	Safe.															
	Council Ridge,	5	9	36	34	70	Belfield,	December, 1877,	Safe,	3	120	1	60	2	175	1	10	7	365					
20	Ebervale,	1	26	22	33	60	Belfield,	December, 1877,	Safe,	2	80	..	..	7	520	1	35	10	635					
21	Ebervale,	2	20	22	34	70	Belfield,	December, 1877,	Safe.	3	120	1	60	2	140	..	..	6	320	1				
22	Ebervale,	3	15	22	34	75	Belfield,	December, 1877,	Safe,	2	65	1	60	2	140	..	..	5	265	1				
23	Harleigh,	1	13	22	30 / 34	60	Cleveland,	November, 1877,	Safe,	2	74	1	24	2	120	..	..	5	218					
24	Harleigh,	3	13	26	30	75	Cleveland,	Idle, 1877,	Safe,	3	128	1	24	2	150	..	..	6	302					
25	Latimer,	1	14	26	30	70	Allen,	January 1, 1878,	Safe,	2	80	1	40	2	160	..	..	5	280					
26	Latimer,	2	12	26	30	70	Allen,	January 1, 1878,	Safe,	2	80	1	40	2	160	..	..	5	280	1				
27	Milnesville,	6	9	22	33	65	Belfield,	January 1, 1878,	Safe,	2	90	1	40	1	70	..	..	4	200					
28	Milnesville,	7	17	22	33	65	Belfield,	December 30, 1877,	Safe,	2	90	1	40	2	160	..	..	5	290					
29	Hollywood,	1	8	22½	33	70	Belfield,	December 31, 1877,	Safe,	1	60	1	40	1	60	..	..	3	160					
30	Hollywood,	2	8	23½	33	70	Belfield,	December 20, 1877,	Safe,	2	120	..	..	1	60	..	..	3	180					
31	East Sugar Loaf,	2	19	22 / 36	33	75	Allen's,	December, 1877,	Safe,	2	100	1	15	1	60	1	30	6	205					
32	East Sugar Loaf, old,	3	9	36	33	70	Allen's,	December, 1877,	Safe,	..	..	..	..	1	60	..	..	1	60					
33	East Sugar Loaf,	7	12	22	33	75	Allen's,	January, 1878,	Safe,	2	80	1	20	1	60	..	..	4	160					
34	East Sugar Loaf,	4	13	36	33	75	Allen's,	December, 1877,	Safe.															
35	East Sugar Loaf,	5	16	36	33	65	Allen's,	January, 1878,	Safe,	4	160	1	20	1	60	1	25	7	265					
	East Sugar L'f, in. flue boiler	5	2	20	42	65	Allen's,	December, 1877,	Safe.															
36	Laurel Hill,		24	22⅓	33	75 to 80	Belfield,	December 6, 1877,	Safe,	4	170	1	25	1	75	*1	15	7	285	1				
37	Hazleton mines,	1	4 / 4 / 3	22½ / 22⅔ / 22⅔	33 / 30 / 30	110 / 35	Belfield,	December 2, 1877,	Safe,	1	60	1	20	1	60	..	..	3	140					
38	Hazleton,	3	9 / 13	36 / 22½	33	60	Belfield,	Dec. 2, 3, 5 and 6, 1877,	Safe,	4	670	1	15	2	150	..	..	7	835					
39	Cranberry,	1	15 / 3	22½ / 30	33	60 / 50	Belfield,	December 2 and 16, 1877,	Safe,	1	60	1	20	1	60	†1	20	4	160					
40	Crystal Ridge,		7 / 3	22½ / 20	33 / 36	65	Belfield,	December 15, 1877,	Safe,	2	120	1	25	..	..	..	..	3	145					
41	Sugar Loaf,	1 / and / 2	12 / 8 / 3	22⅔	30 / 33 / 36	60 / 65	Belfield,	December 1 and 8, 1877,	Safe,	3	120	1	40	2	120	..	..	6	280					
42	South Sugar Loaf,	3	16	22½	33	60	Belfield,	December 2 and 8, 1877,	Safe,	1	90	1	25	..	..	1	15	3	130					
43	Mount Pleasant,	2	13	30	33 / 34	60	Belfield,	Dec. 28, '77, and Jan. 6, '78,	Safe,	1	50	2	35	1	60	†1	20	5	165					
	Mount Pleasant breaker,	2		25½ / 24⅓	34	55	Belfield,	December 28, 1877,	Safe.															
	Mount Pleasant saw-mill,	2		30	34	60	Belfield,	December 28, 1877,	Safe.															
44	Humboldt,	1	10	25 / 30	33	65 to 70	Schoffer & Co.,	Dec. 2, 1877, to Jan. 1, 1878,	Safe,	2	60	1	25	1	60	..	..	4	145					
	Humboldt,	3	8	27 / 22	33	55 to 65	Schoffer & Co.,	Dec. 2, 5, 9 and 11, 1877,	Safe.															
	Humboldt saw-mill,	2		22	33	65	Schoffer & Co.,	December 12, 1877,	Safe.															
	West Lehigh, (Gowen,)	2 / 3	30 / 22	36 / 30		75 / 40	Belfield,	Not reported repairing the boilers,	...	1	60	1	20	..	..	..	..	2	80					
45	Stafford,	1	12	30	36	75	Belfield,	Idle; did not work in 1877	...	8	320	1	40	..	..	..	..	9	360	..	1			
46	Coleraine,	2	9	31	34	60	Ashcroft,	December 27, 1877,	Safe,	3	150	1	30	3	210	..	..	7	390					
	Coleraine, No. 1 breaker,		4	30	34	65	Ashcroft,	January 3, 1878,	Safe.															
47	Coleraine, No. 1 hoisting,	1	4	30	34	75	Bickerton,	January 4, 1878,	Safe,	3	120	1	50	2	120	..	..	6	290	.	1			
	Coleraine shaft,		6	35	34	60	Ashcroft,	January 3, 1878,	Safe.															

TABLE No. 7—Continued.

Number of slopes.	Name of Collieries.	Slope number.	Number of boilers.	Dimensions. Length in feet.	Dimensions. Diameter in inches.	Pressure per square inch in pounds.	Kind of Steam Gauge Used.	Date of Last Boiler Examination.	Present condition, i. e., safe or unsafe.	Number and Horse-power of Engines. No. of hoisting engines.	Horse-power of same.	No. of breaker engines.	Horse-power of same.	No. of pumping engines.	Horse-power of same.	No. of fan engines.	Horse-power of same.	Total number of engines.	Total horse-power.	No. of locomotives under ground.	No. of mine locomotives above ground.
48	Spring Mountain,	1	16	30	34	60	Belfield,	January, 1878,	Safe,	1	80	1	40	3	450	..	...	5	570		
49	Spring Mountain,	4	18	30	34	70	Belfield,	January, 1877,	Safe,	2	120	1	40	2	80	..	...	5	240		
50	Spring Mountain,	5	15	30	34	70	Belfield,	January, 1877,	Safe,	4	180	2	35	2	80	..	...	8	295		
	Spring Mountain drift,	...	2	30	34	65	Belfield,	January, 1878,	Safe,												
51	Beaver Brook,	1	10	30	34	75	Belfield,	January, 1878,	Safe,	2	80	1	40	..	...	..	...	3	120		
52	Beaver Brook,	2	16	30	34	75	Belfield,	January, 1878,	Safe,	2	60	1	30	..	...	..	...	3	90		
53	Beaver Brook,	4	4	30	34	60	Belfield,	January, 1878,	Safe,	2	60	..	...	..	...	..	...	2	60		
54	Beaver Brook,	6	4	30	34	60	Belfield,	January, 1878,	Safe,	1	40	..	...	..	...	1	15	2	55		
55	Spring Brook, (Yorktown,)	6	14	30	34	60	Allen,	January 21, 1878,	Safe,												
56	Spring Brook, (Yorktown,)	5	12	30	34	80	Springfield,	January 22, 1878,	Safe,												
	Spring Brook, (Yorktown,)	2	4	30	34	50	Allen,	January 20, 1878,	Safe,												
57	Tresckow,	6	20	30	34	70	Belfield,	Every 2 to 8 weeks,	Safe,	3	180	2	80	4	385	..	...	9	645		
58	Tresckow,	2	10	30	34	70	Belfield,	Every 2 to 8 weeks,	Safe,												
59	Room Run,	1	8	36	32	75	E. H. Ashcroft,	Dec. 23, Jan. 2 and 4, 1878,	Safe,	4	235	1	46	4	688	3	63	12	1,032	1	1
60	Room Run,	3	9	28	32	65	H. Belfield,	January 2, 4, 7, 1878,	Safe,												
	Room Run fan engine,	...	2	27	36	40	H. Belfield,	January 11, 1878,	Safe,												
	Room Run breaker,	...	4	32	32	75	H. Belfield,	December 23, 1877,	Safe,												
61	Panther Creek,	4	27	32	32	85	H. Belfield,	December, 1877,	Safe,	3	324	1	28	3	1,262	1	28	8	1,642	..	1
	Panther Creek breaker,	4	2	36	32	60	H. Belfield,	December, 1877,	Safe,												
	Panther Cr'k breaker, No.5,	7	4	34	34	60	H. Belfield,	December, 1877,	Safe,	4	158	2	70	1	50	1	15	8	293	1	
	Panther Creek,	6	2	30	28	65	H. Belfield,	December, 1877,	Safe,	..	...	2	43	..	...	1	12	3	55	1	
	Panther Creek,	6	2	26	32	65	H. Belfield,	December, 1877,	Safe,												
	Panther Creek fan,	...	1	flue.	...	60	Shemidt,	December, 1877,	Safe,												
	Panther Cr'k breaker, No.9,	...	3	40	32	85	Shemidt,	December, 1877,	Safe,												
	Panther Cr'k breaker, No.9,	...	2	36	32	85	Shemidt,	December, 1877,	Safe,												
	Panther Cr'k breaker, No.9,	...	4	30	48	55	Belfield,	December, 1877,	Safe,												
62	Panther Creek,	9	11	40	32	75	Belfield,	December, 1877,	Safe,	6	353	2	93	2	404	2	40	12	890	2	
	Screen building in Nesquehoning Valley,	...	20	32	34	85	Belfield,	December, 1877,	Safe,	2	100	1	50	..	...	..	...	3	150		
	Total,	...	915	...	...	...	..	...	...	143	7,551	51	1,928	81	7,973	26	663	306	18,115	12	5
	Average horse-power,	...	...	...	...	..	...	...	...	..	52.8	..	37.8	..	98.4	..	25.5	..	59.2		

* Shop. † Saw-mill.

Table. No. 8.—*List of the Operators and the Number of Collieries in the South District of Luzerne and Carbon counties in 1877.*

Name of Collieries.	Location of Collieries and Post Office Addresses.	Name of Land Owners.	Name of Operators.	Name of Superintendent.	Name of County.	Name of Township.	No. of col's op'd.
Slope Nos. 1 and 2,	Upper Lehigh,	Upper Lehigh Coal Company,	Upper Lehigh Coal Co.,	Daniel Bartsch, jr.,	Luzerne,	Foster,	1
Slope Nos. 3 and 4,	Upper Lehigh,	Upper Lehigh Coal Company,	Upper Lehigh Coal Co.,	Daniel Bartsch, jr.,	Luzerne,	Butler,	1
Woodside,	Woodside, Jedd P. O.,	Jeddo Coal Company,	Coxe Bros. & Co.,	Arthur McClellan,	Luzerne,	Foster,	1
Cross Creek,	Drifton, Jedd P. O.,	Estate Tench Coxe,	Coxe Bros. & Co.,	Arthur McClellan,	Luzerne,	Foster,	2
Highland Nos. 1 & 2,	Highland, Jedd P. O.,	Highland Coal Company,	G. B. Markle & Co.,	G. B. Markle,	Luzerne,	Foster,	2
Sandy Run,	Sandy Run,	Richardson's estate,	M. S. Kemmerer & Co.,	Thomas M. Righter,	Luzerne,	Foster,	1
Buck Mountain,	Buck Mountain,	Buck Mountain Coal Company,	Buck Mountain Coal Co.,	William Spencer,	Luzerne & Carbon,	Foster and Lausann,	1
Council Ridge,	Eckley,	Tench Coxe's estate,	J. Leisenring & Co.,	John S. Wentz,	Luzerne,	Foster,	2
Oak Dale,	Jeddo,	Union Improvement Company,	J. B. Markle & Co.,	G. B. Markle,	Luzerne,	Hazle,	2
Ebervale,	Ebervale,	Union Improvement Company,	Ebervale Coal Company,	Thos. P. McFarland,	Luzerne,	Hazle,	2
Harleigh,	Harleigh, Hazleton P. O.,	Big Black Creek Improvem't Co.,	Harleigh Coal Company,	James McKee,	Luzerne,	Hazle,	2
Lattimer,	Lattimer, Hazleton P. O.,	Black Improvement Company,	Pardee Bros. & Co.,	M. M. Cooper,	Luzerne,	Hazle,	2
Milnesville,	Milnesville,	Porter's estate,	Stout Coal Company,	Charles Kerbaugh,	Luzerne,	Hazle,	2
Hollywood,	Hollywood, Hazleton P. O.,	Big Black Creek Improvem't Co.,	Calvin Pardee & Co.,	C. Pardee,	Luzerne,	Hazle,	1
East Sugar Loaf,	Stockton,	Smith, Roberts & Packer, also Tench Coxe's estate,	Linderman, Skeer & Co.,	William Airey,	Luzerne,	Hazle,	3
South Sugar Loaf,	Near Hazleton,	Diamond Coal Company,	A. Pardee & Co.,	C. Pardee,	Luzerne,	Hazle,	1
Sugar Loaf,	Near Hazleton,	Diamond Coal Company,	A. Pardee & Co.,	C. Pardee,	Luzerne,	Hazle,	1
Laurel Hill,	Hazleton,	Lehigh Valley Railroad Company,	A. Pardee & Co.,	C. Pardee,	Luzerne,	Hazle,	1
Hazleton No. 3,	Hazleton,	Lehigh Valley Railroad Company,	A. Pardee & Co.,	C. Pardee,	Luzerne,	Hazle,	1
Hazleton No. 1,	Hazleton,	Lehigh Valley Railroad Company,	A. Pardee & Co.,	C. Pardee,	Luzerne,	Hazle,	1
Cranberry,	Near Hazleton,	Estate of A. S. & E. Roberts,	A. Pardee & Co.,	C. Pardee,	Luzerne,	Hazle,	1
East Crystal Ridge,	Near Hazleton,	Estate of A. S. & E. Roberts,	A. Pardee & Co.,	C. Pardee,	Luzerne,	Hazle,	1
Mount Pleasant,	Mt. Pleasant, Hazleton P. O.	Estate of C. Koons and others,	Pardee & Son,	C. Pardee,	Luzerne,	Hazle,	1
Humboldt,	Humboldt, Hazleton P. O.,	Lehigh Valley Railroad Company,	Linderman, Skeer & Co.,	William Airey,	Luzerne,	Hazle,	1
West Lehigh,	Gowen,	West Buck Mountain Coal Co.,	Lewis Rothermel,	John T. Evans,	Luzerne,	Black Creek,	1
Stanton,	Gowen,	Anspach, Stanton & Weightman,	I. Martial Stout,	I. M. Stout,	Luzerne,	Black Creek,	Chute.
Stafford,	Beaver Meadow,	Tench Coxe's estate and L. V. R. R. Company,	E. B. Ely & Co.,	James Waddle,	Carbon,	Banks,	1
Coleraine,	Beaver Meadow,	William T. Carter,	C. F. Shoener,	John Wear,	Carbon,	Banks,	2
Spring Mountain,	Jancsville,	Spring Mountain Coal Company,	J. C. Hayden & Co.,	J. C. Hayden,	Carbon & Luzerne,	Banks & Hazle	3
Spring Brook,	Yorktown, Audenried P. O.,	New York and Lehigh Coal Co.,	A. L. Mumper & Co.,	Thomas John,	Carbon,	Banks,	2
Beaver Brook,	Frenchtn, Audenreid P. O.,	C. Tower and others,	Beaver Brook Coal Co.,	E. L. Bullock,	Luzerne,	Hazle,	2
S. Spring Mountain,	Tresckow,	Lehigh and Wilkes-Barre Coal Co.	E. B. Leisenring,	E. B. Leisenring,	Carbon,	Banks,	1
Room Run,	Nesquehoning,	Lehigh Coal and Navigation Co.,	Receivers L. and W. B. Coal Company,	Jos. S. Harris and	Carbon,	Mauch Chunk,	1
Panther Creek,	Lansford,	Lehigh Coal and Navigation Co.,	Receivers L. and W. B. Coal Company,	W. D. Zehner,	Carbon,	Mauch Chunk,	5
Total number of	breakers or collieries,						52

Any one wishing to communicate with any of the operators or superintendents, can do so by referring to the above list. Where the colliery is located, will be the post office address.

TABLE No. 9—*This Tabular Statement is compiled from the Inspectors' Reports since 1871, to December 31, 1877.*

	T. D. Jones, Inspector Lehigh District, or South District of Luzerne and Carbon counties.				T. M. Williams, Inspector Middle District of Luzerne county.				W. S. Jones, Inspector Eastern District of Luzerne county.				Samuel Gay, Inspector Shenandoah District, Schuylkill county.				Wm. Hemingray, Inspector Shamokin District.				Sampson Parton, Inspector Pottsville District, Schuylkill county.				Total during each year.			
	Killed.	Injured.	Widows.	Orphans.	Killed.	Injured.	Widows.	Orphans.	Killed.	Injured.	Widows.	Orphans.	Killed.	Injured.	Widows.	Orphans.	Killed.	Injured.	Widows.	Orphans.	Killed.	Injured.	Widows.	Orphans.	Killed.	Injured.	Widows.	Orphans.
1871, . .	29	35	8	40	53	90	24	80	60	133	38	108	56	168	24	97	43	120	24	95	30	118	18	65	271	664	136	485
1872, . .	25	38	12	33	40	121	21	61	67	187	39	119	42	89	25	68	32	102	15	60	17	74	9	41	223	611	121	382
1873, . .	38	49	20	48	46	91	18	60	56	169	30	78	53	101	31	141	44	101	28	98	29	117	15	61	266	688	142	486
1874, . .	31	38	15	29	57	105	28	71	69	89	38	112	44	95	20	71	20	150	19	49	35	81	14	65	202	558	134	397
1875, . .	21	77	12	20	63	100	13	44	62	102	36	118	26	114	11	48	38	106	13	49	28	88	17	62	238	587	102	341
1876, . .	37	74	21	71	55	87	26	69	44	120	37	71	27	48	12	51	37	61	21	62	28	83	15	75	228	473	132	399
1877, . .	26	60	15	59	38	121	22	65	40	174	129	134	33	58	18	. . .	28	66	17	56	29	111	. . .	. . .	194	590	201	314
	207	371	103	300	352	715	152	450	398	974	347	740	281	733	141	470	248	706	137	469	196	672	88	369	1,682	4,171	968	2,804

TABLE No. 10.—*Exhibits the number of persons employed in each district during the year 1877, and the percentage of fatality for the past seven years.*

Name of Inspector.	District for which they are Appointed.	Number of persons employed.	Percentage.				
			Employed.	Killed.	Injured.	Widows.	Orphans.
T. D. Jones, ...	South District, Luzerne and Carbon counties, ...	9,216	13.8	12.4	8.9	10.6	10.7
T. M. Williams, ...	Middle District, Luzerne county, ...	14,073	21.1	20.9	17.1	15.7	16.4
W. S. Jones, ...	Eastern District, Luzerne county, ...	16,312	24.4	23.7	23.4	35.9	26.3
Samuel Gay, ...	Shenandoah District, Schuylkill county, ...	10,537	15.7	16.7	17.6	14.6	16.9
William Hemingray, ...	Shamokin District, Northumberland county, ...	10,857	16.3	14.7	16.9	14.1	16.7
Sampson Parton, ...	Pottsville District, Schuylkill county, ...	5,847	8.7	11.6	16.1	9.1	13.1
		66,842					

T. D. JONES,
Inspector.

TABLE No. 11.—*The inspectors of the anthracite coal mines of the State of Pennsylvania, have the honor to subjoin a tabular statement of the numbers of separate colliery accidents and loss of life occasioned by such accidents, during the year ending December 31, 1877.*

NAME OF INSPECTORS.	NAME OF THE DISTRICT FOR WHICH THEY ARE APPOINTED.	NO. OF SEPARATE ACCIDENTS.										NO. OF LIVES LOST BY THE ACCIDENT								Tonnage of coal produced in each district.	No. of tons of coal produced to each life lost.	No. of persons employed in and about the anthracite coal mines of Pennsylvania.
		Explosions of C. H² gas.	Falls of roof.	Falls of coal.	In shafts.	In slopes.	By blasting powder.	By mine cars.	Miscellaneous under ground.	Miscellaneous above ground.	Total No. non-fatal accidents.	Explosions of C. H² gas.	Falls of roof.	Falls of coal.	In shafts.	By blasting powder.	By mine cars.	Miscellaneous under ground.	Miscellaneous above ground.	Total No. of fatal accidents.			
T. D. Jones, ...	South district of Luzerne and Carbon counties, ...	9	2	18	. .	. .	6	14	9	2	60	. .	6	11	. .	. .	6	. .	3	26	4,070,015	156,539	9,216
T. M. Williams, . . .	Middle district, Luzerne county, . .	24	33	. .	1	. .	7	22	30	4	121	1	25	. .	2	1	1	6	2	38	4,080,327	107,377	14,073
W. S. Jones, ...	Eastern district, Luzerne county, . .	28	55	9	. .	. .	7	38	26	11	174	1	24	7	. .	1	1	3	3	40	4,808,208	120,205	16,312
Samuel Gay, ...	Second, or Shenandoah district, . . .	7	6	21	. .	1	5	7	2	9	58	. .	2	22	. .	2	2	3	2	33	3,805,467	115,317	10,537
William Hemingray,	Third, or Shamokin district, ...	7	4	27	. .	. .	6	13	7	2	66	. .	2	15	. .	1	4	5	1	28	3,471,562	123,984	10,857
Sampson Parton, . .	First, or Pottsville district, ...	. .	. .	. .	. .	. .	. .	. .	. .	. .	111	. .	. .	. .	. .	. .	. .	. .	. .	29	1,580,780	54,510	5,847
		75	100	75	1	1	31	94	74	28	590	2	59	55	2	5	14	17	11	194	21,816,359	. . . . .	66,842

Table No. 12—*Showing the number of persons killed in the South district of Luzerne and Carbon counties, from 1871 to 1877, inclusive; also, how accident occurred, together with the percentage of each item.*

	1871.	1872.	1873.	1874.	1875.	1876.	1877.	Totals.	Percentage.
Explosions of carbureted hydrogen gas,	. . .	1	1	2	2	4	. . .	10	4.83
Falls of Rock, Slate, and Coal.									
Falls of coal,	10	13	17	6	8	13	11	78	37.7
Falls of slate and rock,	1	2	4	5	3	5	6	26	12.56
Total falls,	11	15	21	11	11	18	17	104	50.24
In Slopes.									
Falling into slopes,	1	. . .	1	. . .	. . .	2	. . .	4	1.93
Hoisting, machinery breaking,	. . .	. . .	. . .	4	1	1	. . .	6	2.9
Sundries in slopes,	3	1	1	. . .	. . .	. . .	. . .	5	2.41
Totals in slopes,	4	1	2	4	1	3	. . .	15	7.24
By Mine Cars.									
By mine cars,	5	3	2	6	. . .	7	6	29	14.
Miscellaneous Underground.									
By explosions of blasting powder,	2	1	. . .	. . .	. . .	1	. . .	4	1.93
By mules,	. . .	. . .	1	. . .	. . .	. . .	. . .	1	.48
By premature blasts,	2	2	4	. . .	. . .	. . .	. . .	8	3.86
By sundries,	1	. . .	2	5	5	1	. . .	14	6.76
Total miscellaneous underground,	5	3	7	5	5	2	. . .	27	13.04
Total underground,	25	23	33	28	19	34	. .	185	89.37
Above Ground.									
By machinery,	. . .	1	1	. . .	1	2	1	6	2.9
By suffocation in breakers chutes,	2	. . .	. . .	. . .	. . .	. . .	2	2	.96
By mine cars,	2	1	3	. . .	1	. . .	. . .	7	3.38
By sundries,	. . .	. . .	1	3	. . .	1	2	7	3.38
Totals above ground,	4	2	5	3	2	3	3	22	10.63
Gross total,	29	25	38	31	21	37	26	207	100.00

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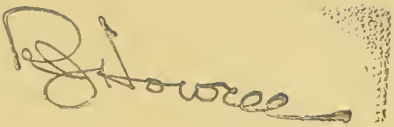
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